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No. 105, ORIGINAL

In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

FIFTH AND FINAL REPORT

VOLUME II

PROPOSED JUDGMENT AND DECREE

January 2008

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No. 105, Original

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

JUDGMENT AND DECREE

This Judgment and Decree is based on the Opinions of the Court in this case and the recommendations of Special Master Arthur L. Littleworth as approved by the Court. See *Kansas v. Colorado*, 514 U.S. 673 (1995); 533 U.S. 1 (2001); 543 U.S. 86 (2004); First Report (1994); Second Report (1997); Third Report (2000); Fourth Report (2003); and Fifth and Final Report (2008).

JUDGMENT

Judgment is awarded against the State of Colorado in favor of the State of Kansas for violations of the Arkansas River Compact resulting from postcompact well pumping in Colorado. Judgment is awarded in the amount of $34,615,146.00 for damages and prejudgment interest, including the required adjustment for inflation, arising from depletions of usable streamflow of the Arkansas River at the Colorado-Kansas Stateline in the amount of 428,005 acre-feet of water during the period 1950-1996. The damages were paid in full on April 29, 2005. Costs through January 31, 2006, including reallocation of Kansas' share of the Special Master's fees and expenses, are awarded to Kansas in the amount of $1,109,946.73. These costs were paid in full on June 29, 2006. By Stipulation, $100,000.00 of the Special Master's fees and expenses are reallocated from the United States to Kansas.

Kansas' claims regarding the Winter Water Storage Program and the operation of Trinidad Reservoir and all Colorado Counterclaims are hereby dismissed.

DECREE

I. Injunction

A. General Provisions

1. It is Ordered, Adjudged, and Decreed that the State of Colorado, its officers, attorneys,

agents, and employees are hereby enjoined to comply with Article IV-D of the Arkansas River Compact by not materially depleting the waters of the Arkansas River, as defined in Article III of the Compact, in usable quantity or availability for use to the water users in Kansas under the Compact by Groundwater Pumping, as prescribed in this Decree, and more particularly:

a. To prevent Groundwater Pumping in excess of the precompact pumping allowance of 15,000 acre-feet per year without Replacement of depletions to Usable Stateline Flow in accordance with this Decree;

b. To enforce the Colorado Use Rules with respect to Groundwater Pumping, unless John Martin Reservoir is spilling and Stateline water is passing Garden City, Kansas; and

c. To enforce the Colorado Measurement Rules with respect to Groundwater Pumping.

2. Compliance with this Decree shall constitute Compact compliance with respect to Groundwater Pumping.

B. Determination of Compact Compliance With Respect to Groundwater Pumping

1. Compact compliance with respect to Groundwater Pumping shall be determined using the results of the H-I Model over a moving

ten-year period beginning with 1997, in accordance with the Compact Compliance Procedures described in Appendix A. Any Shortfall shall be made up by Colorado as specified in Section I.C of this Decree.

2. Annual Calculations of depletions and accretions to Usable Stateline Flow shall be determined using the H-I Model, in accordance with the procedures described in Appendix B and the Durbin usable flow method with the Larson coefficients, which is documented in Appendix C. Annual Calculations shall be done on a calendar year basis unless the States agree to a different year for the calculations. Accumulation of accretions shall be limited as described in Appendix D. The Annual Calculations for each of the years 1997-2006, found in Appendix E, are final, except as set forth in Section III of this Decree. Similarly, the results of Annual Calculations for years after 2006 shall be final for use in the ten-year Compact compliance accounting, when determined as provided in Appendices A and B, subject to the same provisos applicable to the 1997-2006 Annual Calculations.

3. Colorado shall be entitled to credit for Replacement of depletions to Usable Stateline Flow. The credit for Replacement shall be determined using the H-I Model, except for credit derived from operation of the Offset Account, which shall be determined as set out in Appendix F, and except for credit for direct deliveries of water to the Stateline if

the Offset Account does not exist, which shall be determined as set out in Appendix A.

4. The H-I Model may be improved by agreement of the States or pursuant to the Dispute Resolution Procedure contained in Appendix H.

C. Repayment of Shortfalls

1. If there is a Shortfall, Colorado shall make up the Shortfall in accordance with the provisions of Appendix A.

2. Colorado shall make up a Shortfall by delivering water to the Offset Account in John Martin Reservoir to the extent that space is available. To the extent that space is not initially available in the Offset Account, Colorado shall make up the rest of such Shortfall by delivering water to the Offset Account as space becomes available. The timing, accounting, crediting, notice, and other matters related to deliveries of water to make up a Shortfall shall be accomplished pursuant to Appendix A.

II. Dispute Resolution

The States shall work together informally to the maximum extent possible to resolve any disagreements regarding implementation of this Decree. Disagreements that cannot be so resolved shall be submitted to the stipulated Dispute Resolution Procedure contained in Appendix H.

III. Modification of Appendices to the Decree

Appendices A-J may be modified only: (a) by agreement of the States or (b) pursuant to the Dispute Resolution Procedure, *provided* that the Colorado Measurement Rules and Colorado Use Rules may be amended by Colorado to the extent that Colorado can demonstrate that any such amendments will adequately protect Kansas' rights under the Compact, and *further provided* that Appendix E shall not be modified except that it shall be subject to later determinations of Replacement credits to be applied toward Colorado's Compact obligations by the Colorado Division 2 Water Court and any appeals therefrom, and further subject to the right of Kansas to seek relief from such Colorado Water Court determinations under the Court's original jurisdiction. Disputes arising under this Section III shall be subject to the Dispute Resolution Procedure.

IV. Retention of Jurisdiction

A. The Court retains jurisdiction for a limited period of time after the end of the initial ten-year startup period (ending in 2006) for the purpose of evaluating the sufficiency of the Colorado Use Rules and their administration and whether changes to this Decree are needed to ensure Compact compliance. The procedures to be followed are set out in Appendix B.1, Part VII.

B. The retained jurisdiction provided in Section IV.A of this Decree shall terminate at the end of 2008, unless, prior to December 31, 2008, either State has notified the Special Master that there is a dispute concerning the sufficiency or administration of the Use Rules that has been submitted to the Dispute Resolution Procedure. If either State notifies the Special Master as provided herein, the retained jurisdiction shall continue, and the States, within 60 days from the conclusion of the Dispute Resolution Procedure, shall request either further proceedings before the Special Master or termination of the retained jurisdiction provided for in Section IV.A of this Decree. The Special Master shall recommend to the Court such action as he deems appropriate. The Special Master shall be discharged upon termination of the retained jurisdiction provided for in Section IV.A of this Decree.

C. Any of the parties may apply at the foot of this Decree for its amendment or for further relief. The Court retains jurisdiction of this suit for the purpose of any order, direction, or modification of the Decree, or any supplementary decree, that may at any time be deemed proper in relation to the subject matter in controversy.

D. No application for relief under the retained jurisdiction in this Section IV shall be accepted unless the dispute has first been submitted to the Dispute Resolution Procedure.

V. Definitions

Whenever used in this Judgment and Decree, including Appendices, terms defined in the Compact shall have the meaning ascribed to them in the Compact; in addition, the following terms shall mean:

Acre-foot: The volume of water required to cover one acre of land to a depth of one foot, which is equal to 325,851 gallons;

Annual Calculations: The calculation for each year of depletions and accretions to Usable Stateline Flow using the H-I Model, as described in Appendix B;

Appendix: One of the Appendices listed in Section VI of this Decree and included in Volumes II and III of the Special Master's Fifth and Final Report in this case;

Acceptable Sources of Water: As defined in Appendix G;

ARCA: The Arkansas River Compact Administration created by Article VIII of the Compact;

Colorado Measurement Rules: Amended Rules Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin, revised November 30, 2005, contained in Appendix I.1, as they may be amended from time to time in accordance with Article III of this Decree;

Colorado Use Rules: Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin,

Colorado, Kan. Exh. 1123, contained in Appendix J.1, as they may be amended from time to time in accordance with Article III of this Decree;

Compact: The Arkansas River Compact, 63 Stat. 145 (1949); Kan. Stat. Ann. § 82a-520; Colo. Rev. Stat. § 37-69-101;

Dispute Resolution Procedure: As set out in Appendix H;

Groundwater Pumping: Pumping of water from wells (other than the Wiley/Sapp Wells) in excess of 50 gallons per minute, from the alluvial and surficial aquifers along the mainstem of the Arkansas River between Pueblo, Colorado, and the Stateline within the domain of the H-I Model described in Appendix C.1;

H-I Model: The Hydrologic-Institutional Model as described and documented in Appendix C.1;

John Martin Reservoir: The reservoir constructed and operated by the United States Army Corps of Engineers on the mainstem of the Arkansas River approximately 58 miles upstream from the Stateline, as referred to in the Compact;

Offset Account: The storage account established in John Martin Reservoir and operated in accordance with the ARCA Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping, dated March 17, 1997, as amended twice on March 30, 1998, and contained in Appendix L, as the same may be further amended by the ARCA;

Replacement: Delivery of water from Acceptable Sources of Water to prevent depletions caused by Groundwater Pumping;

Shortfall: A net depletion to Usable Stateline Flow based on the results of the H-I Model over a ten-year period using the Compact Compliance Accounting Procedures described in Appendix A;

Usable Stateline Flow: Stateline flow as simulated by the H-I Model and determined to be usable pursuant to the Durbin usable flow method with the Larson coefficients, as set out in Appendix C.2; and

Wiley/Sapp Wells: Wells decreed as alternate points of diversion for precompact surface water rights in Colorado by the District Court, Water Div. 2, State of Colorado, Case Nos. 82CW115 (W-4496), 82CW125 (W-4497), and 89CW82; see App. to Third Report of the Special Master 59-61.

VI. List of Appendices to The Decree

[Printed in Volumes II and III of the Special Master's Fifth and Final Report][1]

A. Compliance and Repayment

1. Compact Compliance and Repayment Accounting Procedures
2. Agreement for an Approved Procedure for Determining Replacement Requirements for Replacement Plans to Demonstrate Available Supplies for Current Year Well Pumping and Shortfall Makeup
3. Agreement Re Substitute Water Supply Plans and Colorado Water Court Decrees for Post-1985 Depletions
4. Agreement Not to Terminate the Offset Account Resolution for a Specified Period and Related Matters

B. H-I Model Updates and Changes

1. Procedures for Annual Updates, Calculation of Depletions and Accretions, Changes to the H-I Model, Reporting, Inspection, and Evaluation of the Colorado Use Rules

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[1] The Appendices are incorporated in this Judgment and Decree as if fully set forth herein; if a prior agreement, stipulation, compact, resolution, or rule included in an Appendix should differ from the original document, the original document shall control.

2. Agreement on Potential Evapotranspiration as Used in the H-I Model

3. Administration of Parcels Claimed for Augmentation Credit Agreement

4. Irrigated Acreage Updating Agreement

5. Sisson-Stubbs Agreement

6. Outliers Agreement

7. Agreement Re Amended Observed Diversion Records

8. Agreement Re Recalibration of the H-I Model

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1. Hydrologic-Institutional Model: Model Documentation

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D. Limitation on Accumulation of Credits Agreement

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   1. Amended Rules Governing the Measurement of Tributary Groundwater Diversions Located in the Arkansas River Basin, revised November 30, 2005

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   2. Additional Requirements for Post-1985 Uses

K. Arkansas River Compact

L. Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping, as Amended March 30, 1998

M. Map of Arkansas River Basin

APPENDICES TO JUDGMENT AND DECREE

APPENDIX A

COMPLIANCE AND REPAYMENT

APPENDIX A.1

Compact Compliance And Repayment Accounting Procedures

1. Introduction

The Annual Calculations to determine Compact compliance with respect to Groundwater Pumping in accordance with this Judgment and Decree ("Decree") shall start with the annual results of H-I Model runs using the procedures set forth in Appendix B of this Decree and credits for deliveries of water released from the Offset Account and evaporation from the Offset Account determined in accordance with Appendix F of this Decree. Accumulation of accretions shall be limited as described in Appendix D of this Decree.

2. Ten-Year Accounting

Each year, after completion of H-I Model runs for the annual update to the H-I Model in accordance with the schedule and procedures described in Appendix B of this Decree and calculations to determine Offset Account credits and accretion limits, not later than March 31, Colorado shall provide Kansas, using the form of the attached Table 1, its H-I Model results for the preceding year and its calculation of Offset Account delivery and evaporation credits, including the results from the immediately preceding nine years, which shall be summed as shown on Table 1 including its determination of any Shortfall (Colorado Shortfall). If there is a Shortfall, Colorado shall

submit a description of sources designated for making up the Shortfall by April 1 in a form consistent with the attached Table 2 as more particularly described in Appendix A.2 of this Decree, to be supplemented with additional sources as they are designated. Not later than May 15 of each year, Kansas shall provide Colorado with results, including its determination of any Shortfall (Kansas Shortfall), using the same form, if they differ from the results and calculation by Colorado.

By June 1, the States shall seek agreement to the accounting using the form of the attached Table 1. If the States have not reached agreement on the accounting by June 1, the dispute shall be submitted to the Dispute Resolution Procedure as set forth in Appendix H of this Decree as a Fast Track Issue, with the period for expert meetings and discussion beginning on June 15.

If Colorado's ten-year accounting shows a Shortfall, then Colorado shall make up the Shortfall by June 1, in addition to current-year replacement requirements as demonstrated in Appendix A.2 of this Decree, and implemented as described in Section 4 or Section 5 of this Appendix, whichever is applicable.

If Kansas' ten-year accounting on May 15 shows a different result with which Colorado does not agree, a Provisional Incremental Shortfall will be determined, unless the Kansas Shortfall is smaller. If the Kansas Shortfall is greater, the Provisional Incremental Shortfall will be determined as follows. The

Provisional Incremental Shortfall will be determined using one of the three following conditions: (1) If both States have calculated a Shortfall and if the difference in results is 1,000 acre-feet (AF) or less, the Provisional Incremental Shortfall will be half of the difference of both States' positions; (2) If both States have calculated a Shortfall and the difference in results is larger than 1,000 AF, the Provisional Incremental Shortfall will be 500 AF plus 25% of the difference that is more than 1,000 AF; or (3) If one State has calculated an accretion to Usable Stateline Flow and the other State has calculated a Shortfall, the Provisional Incremental Shortfall will be 50% of a calculated Shortfall that is less than or equal to 1,000 AF and will be 500 AF plus 25% of any of the calculated Shortfall that is over 1,000 AF. The Provisional Incremental Shortfall will be quantified on May 15 and that value will be provided to Colorado by Kansas with the Kansas ten-year accounting. The Colorado Shortfall and the Provisional Incremental Shortfall amount will be delivered to Kansas by June 1 as described in Section 4 or Section 5 of this Appendix, whichever is applicable.

Once the ten-year accounting is finalized by agreement or dispute resolution, if additional water to make up a Shortfall (Shortfall Makeup) is required above the Colorado Shortfall plus the Provisional Incremental Shortfall amount, it shall be delivered to Kansas within 45 days as described in Section 4 or Section 5 of this Appendix, whichever is applicable.

Notwithstanding the foregoing, unless the States otherwise agree, when final crop statistics become available, the States shall make revised H-I Model runs based on the final crop statistics. The revised H-I Model results shall be used in place of the earlier H-I Model results and a revised Table 1 shall be used to determine the final accounting for that year and shall be used in subsequent ten-year accounting. If the revised result of the ten-year accounting indicates a greater Shortfall than previously determined, then Colorado will deliver to Kansas the additional Shortfall within 45 days as described in Section 4 or Section 5 of this Appendix, whichever is applicable.

3. Determining Adequacy of Replacement Requirements

The Colorado State Engineer shall demonstrate to the Kansas Chief Engineer, in accordance with the provisions of Appendix A.2 of this Decree, that Colorado has sufficient water to provide for replacement obligations for the current year as well as water needed to make up any Shortfall.

4. Making up a Shortfall if the Offset Account Exists

If the Offset Account exists, the agreed upon Shortfall, or if there is a dispute, the Colorado Shortfall and the Provisional Incremental Shortfall, determined in accordance with the methodology set forth in Section 2 of this Appendix, along with its estimated

transit loss and pre-funded evaporation, shall be delivered to the Colorado Consumable Subaccounts of the Offset Account by June 1, less water existing in either the Kansas Consumable Subaccount or the Colorado Consumable Subaccounts that is not designated for current-year replacement requirements.

If the Offset Account exists, any additional Shortfall Makeup required from a subsequent final determination by agreement or dispute resolution, or additional Shortfall Makeup required as a result of the revised H-I Model run based on final crop statistics, determined in accordance with the methodology set forth in Section 2 of this Appendix, along with its estimated transit loss and pre-funded evaporation, shall be delivered to the Colorado Consumable Subaccounts of the Offset Account within 45 days and shall not be transferred to the Kansas Consumable Subaccount until the next succeeding July 1.

Notice of Shortfall Delivery: Paragraph 3 of the Offset Account Resolution (Appendix L of this Decree) provides that the Colorado State Engineer is to provide "timely notice" to the Kansas Chief Engineer of deliveries to the Offset Account. For the purposes of delivering water to make up a Shortfall, timely, prior notice shall be given of a delivery for this purpose as soon as practicable after Colorado has determined the source of the water to be delivered. Colorado will provide notice including the amount of water, the purpose for which the water is delivered, the time of delivery, rate of delivery, the extent to which the

water is fully consumable, and the quantity, timing, and location of any associated return flows.

To the extent space is not available in the Offset Account, Colorado shall notify the Kansas Chief Engineer of that fact. Colorado shall deliver the remaining water to make up the Shortfall as space becomes available in the Offset Account, with prior notice to the Kansas Chief Engineer, or at a later time if agreed to by the Colorado State Engineer and the Kansas Chief Engineer.

Estimated Transit Loss: Water transferred or delivered to the Offset Account shall include an amount for estimated transit losses to deliver the water from the Offset Account to the Stateline. The expected transit loss shall be computed annually based on the volumetrically-weighted average transit loss of Offset Account deliveries over the last three years in which Offset Account deliveries were made. The volumetrically-weighted average transit loss shall be based on total volumes released from all subaccounts of the Offset Account during the releases and on their deliveries as determined by the Offset Account Crediting Agreement (Appendix F.2 of this Decree).

Pre-Funded Evaporation: Water transferred or delivered to the Offset Account shall include an amount for pre-funded evaporation while Colorado is responsible for the evaporation on the Shortfall Makeup. To determine the pre-funded evaporation amount the following quantities should be summed:

→ Shortfall Makeup determined herein, and
→ Estimated transit loss determined above.

For this amount of water, the amount of pre-funded evaporation will be determined using the evaporation rates and the John Martin Reservoir contents in Table A below applied from the date of the transfer or delivery until July 1. Partial deliveries will be calculated in the same manner, from date of delivery to July 1.

Table A: Evaporation rates to determine pre-funded quantity to be delivered with Shortfall Makeup based on daily John Martin Reservoir Accounting from the John Martin Accounting System (JMAS) for Compact Years 1980 through 2004.

	Evaporation Rate (AF evap per AF total contents per day)	
Month	JMR Content less than 77,000 AF as of April 1	JMR Content greater than 77,000 AF as of April 1
January	0.00016	0.00013
February	0.00042	0.00025
March	0.00102	0.00061
April	0.00163	0.00085
May	0.00238	0.00113
June	0.00266	0.00145
July	0.00306	0.00164
August	0.00264	0.00149
September	0.00213	0.00127
October	0.00141	0.00084
November	0.00059	0.00041
December	0.00034	0.00024

If on July 1 the actual amount of evaporation is greater than estimated and if there is not water available in the Colorado Consumable Subaccounts to deliver the entire Shortfall Makeup and estimated transit loss, then Colorado shall make an additional transfer or delivery to the Kansas Consumable Subaccount within 30 days of July 1 to make up the difference, provided that Kansas has not taken delivery of the Kansas Consumable Subaccount.

Assignment of Shortfall Evaporation: Evaporation from Shortfall Makeup water shall be assigned under the provisions of the Offset Account Resolution (Appendix L of this Decree) and the Offset Account Crediting Agreement (Appendix F.2 of this Decree). No earlier than March 31, based upon its annual update to the H-I Model in accordance with the procedure set forth in Section 2 of this Appendix, Colorado shall provide notice to Kansas for any water already residing in the Colorado Consumable Subaccounts of the Offset Account that is intended to be used for Shortfall Makeup, and 30 days after that notice the water shall be transferred to the Kansas Consumable Subaccount. For any Shortfall Makeup not yet delivered to the Offset Account, Colorado will provide notice of delivery for additional water to the Colorado Consumable Subaccount(s) that is intended to be used for Shortfall Makeup and such water will be transferred to the Kansas Consumable Subaccount 30 days after the last delivery day of the water delivered under that notice.

Comparison of Transit Loss: When the Offset Account includes Shortfall Makeup, a comparison between the estimated transit loss (as a percentage) and the actual transit loss (as a percentage) will be made based on the next Offset Account release after June 1 that includes any consumable subaccount water. This comparison is to assure that the estimated transit loss provided with the Shortfall Makeup was sufficient. The actual transit loss on the Offset Account release will be determined based on the entire volume of that release using the Offset Account Crediting Agreement (Appendix F.2 of this Decree). If the actual transit loss is more than the estimated transit loss, then Colorado shall make an additional delivery to the Colorado Consumable Subaccount(s) of the Offset Account within 45 days of the end of the delivery based on the transit loss percentage difference times the amount of the Shortfall and shall not be transferred to the Kansas Consumable Subaccount until the next succeeding July 1.

For purposes of subsequent ten-year accounting, Colorado shall receive credit for deliveries to make up a Shortfall in the same manner as other Offset Account deliveries. These shall be included in column 4 of Table 1.

5. Current-Year Replacement and Shortfall Makeup if the Offset Account Does Not Exist

The States have agreed that they will not exercise their right to terminate the Offset Account prior to

January 1, 2013, and that they will commence work not later than September 30, 2010, on an agreement as to how credit for direct deliveries of water to the Stateline for replacement of depletions to usable Stateline flow and to make up a Shortfall shall be determined if the Offset Account does not exist after December 31, 2012. See Appendix A.4 of this Decree.

6. Substitute Water Supply Plans And Colorado Water Court Decrees For Post-1985 Depletions

Accounting for substitute water supply plans and Colorado Water Court decrees for post-1985 depletions will be determined in accordance with the provisions of Appendix A.3 of this Decree.

APPENDIX A.1

Table 1

An illustrative example showing a ten-year accounting done in 2007 resulting in a 1997-2006 Shortfall, using the concept embodied in Colorado Exhibit 1459 for years 3 through 12

Ten-Year Accounting of Depletions and Accretions to Usable Stateline Flow 1997 – 2006								
1	2	3	4	5	6	7	8	9
Year of Ten-year Cycle	Model Year	H-I Model Usable Depletion/ Accretion[1]	Offset Account Credits[2]					Remaining Usable Depletion/ Accretion[6]
			Stateline Delivery to Kansas	Evaporation Credit	Gross Credit[3]	Applied to Post-1985 Depletions[4]	Net Credit[5]	
1	1997	-3000						-3000
2	1998	1000						1000
3	1999	2000						2000
4	2000	-1000						-1000
5	2001	2000						2000
6	2002	1000						1000
7	2003	2000						2000
8	2004	-2000						-2000
9	2005	-1000						-1000
10	2006	2000						2000
Total		3000						3000
Shortfall for 2007								3000

Water quantities are in acre-feet.

[1] Positive values in Columns 3 and 9 reflect depletions; negative values, accretions.

[2] Positive values in Columns 4, 5, 6, and 8 reflect credits; negative values, debits.

[3] Column 6 is the sum of Columns 4 and 5.

[4] Column 7, a positive value, is the amount of Offset Credit applied to Post-1985 depletions, determined pursuant to Appendix A.3 of this Decree

[5] Column 8 is Column 6 minus Column 7

[6] Column 9 is Column 3 minus Column 8

APPENDIX A.1

Table 2

An Illustrative Example for 2007 due to a 1997-2006 Shortfall

Table 2: Sources of Water Designated for Shortfall Makeup						
Replacement Source	Reservoir or Location	Amount[1]	Estimated Transit Loss to Deliver to Offset Account	Estimated Evaporation	Estimated Transit Loss to Stateline	Net Amount Available for Shortfall Makeup
		(AF)	(AF)	(AF)	(AF)	(AF)
Offset Account Upstream Consumable (AGUA-CWPDA)	John Martin Reservoir	74	0	5	15	54
Offset Account Downstream Consumable (LAWMA)	John Martin Reservoir	1520	0	78	317	1125
Offset Account Kansas Consumable	John Martin Reservoir	0	0	0	0	0
Offset Account Pending Evaporation Credits (LAWMA)	John Martin Reservoir	30	0	0	7	23
Section II Consumable (LAWMA)	John Martin Reservoir	1151	0	59	240	852
Pueblo Board of Water Works Consumable (AGUA-CWPDA)	Pueblo Reservoir	850	85	39	160	566
Colorado Springs Consumable (CWPDA)	Lake Meredith	550	36	27	107	380
Offset Account Upstream Consumable (AGUA-CWPDA)	John Martin Reservoir	74	0	5	15	54
	Totals	4175	121	208	846	3000
Remaining Shortfall						0

[1]Source: Appendix A.2, Exhibit 1. Replacement Supply designated for Shortfall makeup and not available to replace current year pumping depletions.

APPENDIX A.2

Agreement for an Approved Procedure for Determining Replacement Requirements for Replacement Plans to Demonstrate Available Supplies for Current Year Well Pumping and Shortfall Makeup

May 30, 2007

1. Introduction

The purpose of this agreement is to provide a description of the methodology to be used by Colorado, in cooperation with the Colorado well users, including the Colorado Well Associations, to demonstrate that there is sufficient water to provide replacement water in the current year as well as to make up any Shortfall (i.e., a net depletion to usable Stateline flow based on the results of the H-I Model over a ten-year period using the Compact Accounting Procedures described in Appendix A.1 to the proposed Judgment and Decree in Kansas v. Colorado). The depletions and replacements should include depletions and replacements by the Colorado Well Associations, other individuals and entities with pumping in the H-I Model area pursuant to replacement plans, substitute water supply plans, and augmentation plans that rely in part on replacement sources represented in the H-I Model or the Offset Account. Replacement supplies allocated to non-H-I Model depletions should be identified and tabulated separately from available supplies that which are intended to replace

depletions to usable stateline flow simulated by the H-I Model or provide Shortfall Makeup water.

Colorado will provide a summary that describes replacement obligations and identifies the available replacement supplies necessary to:

- Replace lagged stream depletions from previous years' pumping;
- Provide the amount of water to make up a Shortfall, including transit losses as computed from the volumetric average of the previous releases for the past three years and the estimated evaporative losses from the time of delivery to the time of release or transfer of the responsibility for evaporation from Colorado to Kansas; and
- Provide replacement water to replace additional stream depletions from pumping in the current year.

2. Base Replacement Demand from Previous Pumping

Each year, prior to March 31, Colorado will compute lagged stream depletions for the current H-I Model year from pumping during prior years and the current year through March 31 by utilizing the Ground Water Accounting Model developed by Colorado to implement the 1996 groundwater use rules for irrigation wells within the H-I Model area and the Glover Model for all non-irrigation wells or irrigation wells outside the H-I Model area (as normally utilized in

monthly replacement operations). Pumping through February of the current year will be computed based on actual pumping from Colorado's records; March pumping for the current year will be as estimated in each replacement plan. Wellhead depletions will be determined using either presumptive depletion factors in effect for the year the pumping occurred or appropriate well-by-well depletion factors and stream depletions will be determined utilizing the appropriate modeling technique. Depletions to Stateline flows will be limited to depletions to usable Stateline flows to the extent replacement is provided from the Offset Account.

The computed stream depletions and depletions to usable Stateline flow for the current H-I Model year will be considered the base replacement requirement for the Colorado replacement plans. Sources of water available for this replacement and set out in Appendix G.1 will be identified based first on known sources of available supply, such as previously allocated Fry-Ark return flows that are destined to accrue to the stream from previous deliveries by H-I Model ditches, expected Fry-Ark return flow allocations, stored supplies transferable to the Offset Account in John Martin Reservoir held by well associations (and reduced to consumptive use), stored replacement supplies in control of each association, lagged accretions attributed to previous deliveries to recharge vessels and contracted municipal sources already held in storage and deliverable.

3. Provisions for Making up a Shortfall

If the preliminary H-I Model results for the annual update to the H-I Model and calculations to determine Offset Account credits indicate a possible Shortfall, Colorado replacement plans will identify the currently available sources of replacement water that will make up the Shortfall, after replacement supplies have been identified to replace the base replacement requirement, including estimated transit losses and estimated evaporation. Sources of supply to make up a Shortfall could include water already in the consumable sub-accounts of the Offset Account, consumptive use components of water transferable to the Offset Account currently possessed by the well associations, and other appropriate sources of replacement that are appropriate for delivery to the Offset Account and specified in Appendix G.1.

4. Determination of Remaining Available Replacement Supplies to Support Pumping Within the Current H-I Model Year or to Meet Other Obligations of Colorado well users

After replacement supplies have been identified to meet the base replacement demand and make up any Shortfall, current year pumping will be based on any remaining replacement supplies, including the reasonable estimated yields from direct-flow replacement sources utilizing the average monthly historical consumptive use for the various water rights, limited by decree limits applied to prior year yields and discounted based on runoff projections for below

average supplies, anticipated additional storage supplies, contracted supplies from municipalities, estimated Fry-Ark allocations, including return flow allocations, and other sources of replacement water specified in Appendix G.1. Estimated available supplies will also take into consideration reasonable estimated contingencies and appropriate consideration of lagged depletions for the following year. Pumping within the year will be limited to amounts for which current year depletions can be replaced with the supply available for replacement, after deducting the prior obligations, including Shortfall makeup and base replacement for previous pumping.

5. Reporting of Replacement Supply Determination

Colorado agrees to report the replacement supply analysis for each replacement plan as an attached enclosure to the annual plan approval letters, with a summary for each plan as shown in attached Exhibit 1. The information to be provided to Kansas by April 1 is shown in attached Exhibit 2. Additional information requested by Kansas, related to the April 1 submittal, will be provided within 15 days of Kansas' request. Approval letters for replacement plans will include a temporary approval until June 1 in order to provide Kansas with an opportunity to provide feedback comments on the replacement supply analysis. Not later than May 15, Kansas will provide Colorado with comments on any disagreement with the information provided by Colorado in order to give Colorado

adequate time to react with appropriate changes for the final plan approval, so that the states can reach agreement by June 1 on the sufficiency of water for makeup of any Shortfall and current year depletions. The final June 1 replacement plans shall be based on current estimates of replacement sources and water supply conditions, which may allow additional pumping or may require a reduction in allowable pumping from the pumping specified in the temporary approvals.

Colorado will provide Kansas with final replacement plan approvals and any subsequent amendments at the time of such approvals.

JOINTLY APPROVED:

/s/ Hal D. Simpson	/s/ David L. Pope
Hal D. Simpson,	David L. Pope,
Colorado State Engineer	Kansas Chief Engineer
Date: 5/30/07	Date: 6/5/2007

APPENDIX A.2
Exhibit 1

Example of Replacement Supply Analysis for the LAWMA Plan

Replacement Source	Storage or Measurement Location	Amount Applied to Stream Depletions from Prior Pumping	Amount Applied to Shortfall Makeup	Amount Applied to Stream Depletions from Current Year Pumping	Total Amount of Source
		(AF)	(AF)	(AF)	(AF)
Offset Account Downstream Consumable	John Martin Reservoir	0	1520	400	1920
Pending Offset Evaporation Credit	Reaches 9-18	0	30	0	30
Fryingpan – Arkansas Project Return flow allocation	Reaches 9-12	450	0	333	683
Lamar Canal	Center Farm Aug Station	1652	0	3000	4652
Ft. Bent Ditch	Fort Bent Aug Station	139	0	500	639
X-Y Canal	Granada Gage	1193	0	1700	2893
Manvel Canal Article II water	Center Farm Aug Station	45	0	155	200
Manvel Canal	Granada Gage	25	0	75	100
Sisson-Stubbs Ditch/Stubbs	Per Sisson-Stubbs Agreement	72	0	200	272
Sisson-Stubbs Ditch/Sisson	Per Sisson-Stubbs Agreement	72	0	200	272
TL of deliveries to the Offset Account/Highland	Reach 10	18	0	52	70
TL of deliveries from the Offset Account/ non-consumptive portion	Reaches 10-16	50	0	250	300
Article II Account water (consumable portion)	John Martin Reservoir	0	1151	487	1638
Highland Canal	John Martin Reservoir or Reaches 10-16	1622	0	1800	3422
Keesee water rights	Jon Martin Reservoir or Reaches 10-16	1726	0	2300	4026
	Totals	7064	2701	11452	21117

APPENDIX A.2

Exhibit 2

List of items to be provided to Kansas to demonstrate the adequacy of replacement supplies

Pumping – The following data is to be provided by well, with subtotals by Association (Irrigation/non-irrigation) and H-I Model User number, except as noted:

- Type of Use (Irrigation/non-irrigation)
- Location (mainstem, tributary, above Pueblo)
- Amount of projected Pumping
- Amount of Well-head depletions
- Depletions from previous pumping (by stream reach and type of use)
- Projected Depletions for current plan year pumping (by stream reach and type of use)

Replacement supplies

- Source, yield, projected schedule (monthly)
- Source specified by water right, source of water, ownership, and lease information.
- Storage water available (reservoir, type or source, account or owner)
- Projected deliveries to Offset Account for Shortfall and current year depletions

- Estimated yields of direct flow sources, based on historic consumptive use, prior yields under decrees and projected water supply.
- Projected Operation to Balance Depletions and Shortfall with Replacement Supply
- Data to be provided in electronic databases or spreadsheets.

APPENDIX A.3

Agreement Re Substitute Water Supply Plans And Colorado Water Court Decrees For Post-1985 Depletions

This Agreement is entered into by the State of Colorado and the State of Kansas (States).

WHEREAS, the States are engaged in the preparation of a proposed Judgment and Decree (Decree) in *Kansas v. Colorado*, No. 105 Orig., U.S. Supreme Court, and the Decree is presently in draft form (draft Decree); and

WHEREAS, the Hydrologic-Institutional Model (H-I Model) has been developed in the course of *Kansas v. Colorado*, No. 105, Orig., U.S. Supreme Court, and is described in detail in Appendix C.1; and

WHEREAS, the States' experts have recognized the need to apply separate procedures to the quantification of depletions caused by groundwater pumping associated with substitute water supply plans approved pursuant to Colo. Rev. Stat. § 37-92-308 or Colorado Water Court decrees approving plans for augmentation and other post-1985 water uses in Colorado (collectively "Post-1985 Depletions"), and have further recognized that Post-1985 Depletions should be represented in the H-I Model to the extent the replacement water used to replace the Post-1985 Depletions is also represented in the H-I Model; and

WHEREAS, Colorado District Court, Water Div. No. 2, entered its decree on March 2, 2007, in Case No. 02CW181 (LAWMA Decree); and

WHEREAS, the Offset Account was established by the Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping, as Amended March 30, 1998 (Appendix L to the draft Decree).

WHEREAS, the States entered into the Agreement Concerning the Offset Account in John Martin Reservoir for Colorado Pumping, Determination of Credits for Delivery of Water Released for Colorado Pumping, and Related Matters, on Sept. 29, 2005 (Appendix F.2 to the draft Decree) (Offset Account Crediting Agreement).

WHEREAS, the States' experts have conferred and agreed upon separate procedures to be applied to Post-1985 Depletions and replacement therefor.

NOW, THEREFORE, the States agree as follows:

Accounting for Post-1985 Depletions for which replacements are provided from the Offset Account in John Martin Reservoir or sources represented by the H-I Model shall be conducted as follows:

1. Post-1985 Depletions from April 1 through October 31 that are replaced by sources represented in the H-I Model will be input as negative special waters in Data Set 22 to the H-I Model and will be represented in the Historical H-I Model run only.

2. Post-1985 Depletions from November 1 through March 31 (Winter) will normally be accounted for by deducting the depletions, on a one-for-one basis, from the Offset Account credits for delivery of water released from the Offset Account and evaporation computed according to the Offset Account Crediting Agreement. Accordingly, Winter Post-1985 Depletions and replacement therefor will normally be excluded from the H-I Model. However, Winter Post-1985 Depletions and replacement therefor may be included in the H-I Model if both are included and if the replacement water was actually provided to the river on a one-for-one basis.

3. The Post-1985 Depletions caused by the Prowers County Grazing, Inc., operations will be determined in accordance with the memorandum from Dale Book and Steve Larson to Bill Tyner dated July 25, 2006 (attached hereto). Other Post-1985 Depletions that are described in Paragraph 47 and Exhibit R of the LAWMA Decree shall be quantified as provided therein. Post-1985 Depletions subject to other Colorado Water Court decrees approving plans for augmentation shall be quantified as provided therein.

Post-1985 Depletions not determined by Colorado Water Court decrees approving plans for augmentation will be determined by the Colorado State Engineer using procedures and records of water use consistent with the methods described in the LAWMA Decree. Post-1985 Depletions, for which applicable procedures and records are not included in the

LAWMA Decree or not determined by other Colorado Water Court decrees, shall be determined using procedures and records of water use consistent with standard engineering practices, subject to review and agreement by Kansas. In the event that Kansas does not agree with the Colorado State Engineer's or Water Court's determination of a Post-1985 Depletion, either State may designate the issue as a Fast Track Issue for resolution under the Dispute Resolution Procedure in Appendix H. If either State submits a future Colorado State Engineer or Water Court determination of a Post-1985 Depletion to the Dispute Resolution Procedure, Colorado shall have the burden to demonstrate that the Post-1985 Depletions were determined in accordance with the above provisions of this paragraph 3, except that in the case of Post-1985 Depletions determined by the Colorado Water Court, Colorado shall have the burden to demonstrate that the determination is correct. For Post-1985 Depletions not determined by Colorado Water Court decrees approving plans for augmentation, Colorado shall further have the burden to demonstrate that the procedures and records of water use are consistent with the methods described in the LAWMA Decree or, if applicable procedures and records are not included in the LAWMA Decree, that the determination of Post-1985 Depletions used procedures and records of water use consistent with standard engineering practices.

4. Post-1985 Depletions shall be 100% replaced, with no reduction on the basis of usability, except as provided in Appendix J.2 of the Decree.

5. This Agreement shall have no effect on Kansas' right to challenge any part of the LAWMA Decree under the U.S. Supreme Court's original jurisdiction, other than the provisions of the LAWMA Decree specifically applicable to Post-1985 Depletions in Paragraphs 47 and Exhibit R thereof.

JOINTLY APPROVED on August 31, 2007.

STATE OF KANSAS	**STATE OF COLORADO**
/s/ John B. Draper	/s/ David W. Robbins
John B. Draper	David W. Robbins
Special Assistant Attorney General	Special Assistant Attorney General
Counsel of Record	Counsel of Record

ATTACHMENT TO APPENDIX A.3

Memorandum

To: Bill Tyner

From: Dale Book and Steve Larson

Date: July 25, 2006

RE: Depletions for Prowers County Grazing SWSP

We have reviewed the proposed depletions for the Prowers County Grazing SWSP pumping provided in your report of April 11, 2006. The depletions you proposed were computed as 4% of the net pumping. We have developed a model to compute the timing of depletions from pumping on Big Sandy Creek downstream to a live reach and applied that analysis to the net pumping. The following assumptions were used:

1. Pumping was initiated in 2001. We have not attempted to recompute the depletions for year 2000, and have not considered any pumping prior to year 2001 in the depletions we calculated beginning in year 2001. We have pumping records for 2003-2005. We used the average of those years for 2001 and 2002.

2. The net pumping is assumed to be 85% of the total pumping.

Stream Depletions from Wells Along Alluvium of Big Sandy Creek

A simple model of the Big Sandy Creek alluvial aquifer was constructed to compute the depletions to perennial reaches of Big Sandy Creek. Big Sandy Creek was assumed to be perennial beginning from a location just below the point where the Amity Canal intersects Big Sandy Creek. The wells in question are located about 3 miles north of this intersection.

The model area was approximately 1.5 miles wide by 20 miles long. The model grid spacing was set at 792 feet (10 nodes) in an east-west direction and 2,640 feet in a north-south direction (41 nodes). The model was extended to the north to account for a continuing but less transmissive groundwater system approximately along the axis of Big Sandy Creek. The transmissivity was varied in a step-wise fashion from about 90,000 gpd/ft at the south end of the model to about 11,000 gpd/ft at the north end. Specific yield was assigned a value of 0.2. The well was estimated to be located just east of the center line of the 1.5 mile east-west aquifer span. About 2 miles of the perennial reach of Big Sandy Creek was included as a constant-head boundary aligned north-south near the center of the east-west aquifer span. This boundary provides the location for stream flow depletions to occur in response to pumping.

Pumping was varied on a monthly basis according to the attached schedule. Each month was subdivided into 6 uniform time steps to calculate the impacts

from pumping on groundwater storage and stream flow depletions. After 5 years of pumping, the residual impacts from the 5 years of pumping were calculated over the ensuing 25-year period.

Model results were aggregated on the monthly basis to provide monthly estimates of stream flow depletion.

Results

The attached spreadsheet includes the total and net pumping used in the analysis. We have also provided a comparison of the model results to the results obtained using Glover and SDF. The Glover parameters are included in the file. The SDF value was obtained from the LAWMA decree.

The depletions for each of the years 2001-2005 are provided. Residual depletions to be included in future-year accounting are also provided through year 2030.

In summary, we believe this analysis provides a more accurate representation of the Prowers County Grazing pumping, for past years and going forward. Because of the magnitude of the irrigated acreage (740 acres), the close proximity to Big Sandy Creek and the amount of pumping occurring, the approach used for prior years accounting under the SWSP is considered too low. The SDF approach proposed in the LAWMA decree for this pumping results in timing of depletions that we consider delayed too long.

Please review these results and provide any comments.

Prowers County Grazing

Pumping for Irrigation
(Two Wells combined)

	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Total
2003	16	47	218	120	156	268	268	114	98	12	1,317
2004	0	97	152	197	63	164	164	100	70	0	1,008
2005	0	0	166	141	36	229	317	137	33	0	1,060
Avg	5	48	179	153	85	220	250	117	67	4	1,128
%	0%	4%	16%	14%	8%	20%	22%	10%	6%	0%	

Net Pumping
85% Consumptive Use Factor

2003	13	40	186	102	133	228	228	97	84	10	1,120
2004	0	83	129	167	54	139	139	85	59	0	856
2005	0	0	141	120	31	195	269	116	28	0	901
Avg	4	41	152	130	72	187	212	99	57	3	959

Note: Avg Net pumping used for 2001 and 2002.

Total Net Depletions (5 years) 4,795

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Prowers County Grazing

Depletions proposed by Kansas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2000	0.0	0.0	0.7	0.7	4.7	4.7	5.9	4.1	4.1	2.6	0.0	0.0	27.3
2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.6	1.5
2002	0.9	1.1	1.6	1.9	2.4	2.7	3.3	3.7	4.0	4.6	4.9	5.6	36.8
2003	6.1	6.0	7.2	7.5	8.3	8.6	9.4	9.9	10.0	10.9	11.0	11.9	106.8
2004	12.5	12.2	13.7	13.8	14.9	14.9	16.0	16.6	16.5	17.6	17.6	18.7	185.0
2005	19.2	17.8	20.2	20.0	21.1	20.8	21.8	22.2	21.7	22.8	22.4	23.4	253.4
													610.8

NOTE: Year 2000 depletions from Colorado

Residual Depletions Through 2030 From Prowers County Grazing Pumping 2001-2005

	Larson Model		Larson Model		Larson Model
Time	Amity Canal	Time	Amity Canal	Time	Amity Canal
Jan-2000		May-2004	**14.8546**	Sep-2008	**21.6983**
Feb-2000		Jun-2004	**14.9311**	Oct-2008	**21.4307**
Mar-2000		Jul-2004	**15.9926**	Nov-2008	**21.1640**
Apr-2000		Aug-2004	**16.5522**	Dec-2008	**20.8990**
May-2000		Sep-2004	**16.5418**	Jan-2009	**20.6357**
Jun-2000		Oct-2004	**17.6326**	Feb-2009	**20.3747**
Jul-2000		Nov-2004	**17.5805**	Mar-2009	**20.1163**
Aug-2000		Dec-2004	**18.7002**	Apr-2009	**19.8603**
Sep-2000		Jan-2005	**19.2334**	May-2009	**19.6069**
Oct-2000		Feb-2005	**17.8145**	Jun-2009	**19.3568**
Nov-2000		Mar-2005	**20.1996**	Jul-2009	**19.1096**
Dec-2000		Apr-2005	**19.9909**	Aug-2009	**18.8659**
Jan-2001	**0.0000**	May-2005	**21.0819**	Sep-2009	**18.6252**
Feb-2001	**0.0000**	Jun-2005	**20.7760**	Oct-2009	**18.3881**
Mar-2001	**0.0000**	Jul-2005	**21.8247**	Nov-2009	**18.1541**
Apr-2001	**0.0002**	Aug-2005	**22.1596**	Dec-2009	**17.9236**
May-2001	**0.0019**	Sep-2005	**21.7489**	Jan-2010	**17.6970**
Jun-2001	**0.0081**	Oct-2005	**22.7879**	Feb-2010	**17.4729**
Jul-2001	**0.0265**	Nov-2005	**22.3635**	Mar-2010	**17.2529**
Aug-2001	**0.0659**	Dec-2005	**23.3746**	Apr-2010	**17.0362**
Sep-2001	**0.1306**	Jan-2006	**23.3643**	May-2010	**16.8231**
Oct-2001	**0.2462**	Feb-2006	**23.7124**	Jun-2010	**16.6129**
Nov-2001	**0.3946**	Mar-2006	**24.0571**	Jul-2010	**16.4061**
Dec-2001	**0.6283**	Apr-2006	**24.3883**	Aug-2010	**16.2033**
Jan-2002	**0.9116**	May-2006	**24.6967**	Sep-2010	**16.0033**
Feb-2002	**1.1096**	Jun-2006	**24.9743**	Oct-2010	**15.8066**
Mar-2002	**1.5919**	Jul-2006	**25.2153**	Nov-2010	**15.6130**
Apr-2002	**1.9284**	Aug-2006	**25.4162**	Dec-2010	**15.4231**
May-2002	**2.4132**	Sep-2006	**25.5747**	Jan-2011	**15.2358**
Jun-2002	**2.7477**	Oct-2006	**25.6905**	Feb-2011	**15.0520**
Jul-2002	**3.2712**	Nov-2006	**25.7643**	Mar-2011	**14.8711**
Aug-2002	**3.7124**	Dec-2006	**25.7980**	Apr-2011	**14.6929**
Sep-2002	**4.0180**	Jan-2007	**25.7938**	May-2011	**14.5179**
Oct-2002	**4.6071**	Feb-2007	**25.7544**	Jun-2011	**14.3456**
Nov-2002	**4.9162**	Mar-2007	**25.6826**	Jul-2011	**14.1765**
Dec-2002	**5.5813**	Apr-2007	**25.5816**	Aug-2011	**14.0099**
Jan-2003	**6.1162**	May-2007	**25.4546**	Sep-2011	**13.8463**
Feb-2003	**5.9983**	Jun-2007	**25.3041**	Oct-2011	**13.6852**
Mar-2003	**7.1868**	Jul-2007	**25.1332**	Nov-2011	**13.5267**
Apr-2003	**7.4968**	Aug-2007	**24.9444**	Dec-2011	**13.3710**
May-2003	**8.3011**	Sep-2007	**24.7399**	Jan-2012	**13.2182**
Jun-2003	**8.5522**	Oct-2007	**24.5219**	Feb-2012	**13.0670**
Jul-2003	**9.3591**	Nov-2007	**24.2930**	Mar-2012	**12.9186**
Aug-2003	**9.8739**	Dec-2007	**24.0544**	Apr-2012	**12.7728**
Sep-2003	**10.0376**	Jan-2008	**23.8079**	May-2012	**12.6292**
Oct-2003	**10.8770**	Feb-2008	**23.5548**	Jun-2012	**12.4882**
Nov-2003	**11.0259**	Mar-2008	**23.2970**	Jul-2012	**12.3491**
Dec-2003	**11.9350**	Apr-2008	**23.0351**	Aug-2012	**12.2127**
Jan-2004	**12.5087**	May-2008	**22.7702**	Sep-2012	**12.0782**
Feb-2004	**12.2366**	Jun-2008	**22.5033**	Oct-2012	**11.9460**
Mar-2004	**13.6698**	Jul-2008	**22.2353**	Nov-2012	**11.8156**
Apr-2004	**13.8045**	Aug-2008	**21.9669**	Dec-2012	**11.6872**

Residual Depletions Through 2030 From Prowers County Grazing Pumping 2001-2005

	Larson Model		Larson Model		Larson Model
Time	Amity Canal	Time	Amity Canal	Time	Amity Canal
Jan-2000		May-2004	**14.8546**	Sep-2008	**21.6983**
Feb-2000		Jun-2004	**14.9311**	Oct-2008	**21.4307**
Mar-2000		Jul-2004	**15.9926**	Nov-2008	**21.1640**
Apr-2000		Aug-2004	**16.5522**	Dec-2008	**20.8990**
May-2000		Sep-2004	**16.5418**	Jan-2009	**20.6357**
Jun-2000		Oct-2004	**17.6326**	Feb-2009	**20.3747**
Jul-2000		Nov-2004	**17.5805**	Mar-2009	**20.1163**
Aug-2000		Dec-2004	**18.7002**	Apr-2009	**19.8603**
Sep-2000		Jan-2005	**19.2334**	May-2009	**19.6069**
Oct-2000		Feb-2005	**17.8145**	Jun-2009	**19.3568**
Nov-2000		Mar-2005	**20.1996**	Jul-2009	**19.1096**
Dec-2000		Apr-2005	**19.9909**	Aug-2009	**18.8659**
Jan-2001	**0.0000**	May-2005	**21.0819**	Sep-2009	**18.6252**
Feb-2001	**0.0000**	Jun-2005	**20.7760**	Oct-2009	**18.3881**
Mar-2001	**0.0000**	Jul-2005	**21.8247**	Nov-2009	**18.1541**
Apr-2001	**0.0002**	Aug-2005	**22.1596**	Dec-2009	**17.9236**
May-2001	**0.0019**	Sep-2005	**21.7489**	Jan-2010	**17.6970**
Jun-2001	**0.0081**	Oct-2005	**22.7879**	Feb-2010	**17.4729**
Jul-2001	**0.0265**	Nov-2005	**22.3635**	Mar-2010	**17.2529**
Aug-2001	**0.0659**	Dec-2005	**23.3746**	Apr-2010	**17.0362**
Sep-2001	**0.1306**	Jan-2006	**23.3643**	May-2010	**16.8231**
Oct-2001	**0.2462**	Feb-2006	**23.7124**	Jun-2010	**16.6129**
Nov-2001	**0.3946**	Mar-2006	**24.0571**	Jul-2010	**16.4061**
Dec-2001	**0.6283**	Apr-2006	**24.3883**	Aug-2010	**16.2033**
Jan-2002	**0.9116**	May-2006	**24.6967**	Sep-2010	**16.0033**
Feb-2002	**1.1096**	Jun-2006	**24.9743**	Oct-2010	**15.8066**
Mar-2002	**1.5919**	Jul-2006	**25.2153**	Nov-2010	**15.6130**
Apr-2002	**1.9284**	Aug-2006	**25.4162**	Dec-2010	**15.4231**
May-2002	**2.4132**	Sep-2006	**25.5747**	Jan-2011	**15.2358**
Jun-2002	**2.7477**	Oct-2006	**25.6905**	Feb-2011	**15.0520**
Jul-2002	**3.2712**	Nov-2006	**25.7643**	Mar-2011	**14.8711**
Aug-2002	**3.7124**	Dec-2006	**25.7980**	Apr-2011	**14.6929**
Sep-2002	**4.0180**	Jan-2007	**25.7938**	May-2011	**14.5179**
Oct-2002	**4.6071**	Feb-2007	**25.7544**	Jun-2011	**14.3456**
Nov-2002	**4.9162**	Mar-2007	**25.6826**	Jul-2011	**14.1765**
Dec-2002	**5.5813**	Apr-2007	**25.5816**	Aug-2011	**14.0099**
Jan-2003	**6.1162**	May-2007	**25.4546**	Sep-2011	**13.8463**
Feb-2003	**5.9983**	Jun-2007	**25.3041**	Oct-2011	**13.6852**
Mar-2003	**7.1868**	Jul-2007	**25.1332**	Nov-2011	**13.5267**
Apr-2003	**7.4968**	Aug-2007	**24.9444**	Dec-2011	**13.3710**
May-2003	**8.3011**	Sep-2007	**24.7399**	Jan-2012	**13.2182**
Jun-2003	**8.5522**	Oct-2007	**24.5219**	Feb-2012	**13.0670**
Jul-2003	**9.3591**	Nov-2007	**24.2930**	Mar-2012	**12.9186**
Aug-2003	**9.8739**	Dec-2007	**24.0544**	Apr-2012	**12.7728**
Sep-2003	**10.0376**	Jan-2008	**23.8079**	May-2012	**12.6292**
Oct-2003	**10.8770**	Feb-2008	**23.5548**	Jun-2012	**12.4882**
Nov-2003	**11.0259**	Mar-2008	**23.2970**	Jul-2012	**12.3491**
Dec-2003	**11.9350**	Apr-2008	**23.0351**	Aug-2012	**12.2127**
Jan-2004	**12.5087**	May-2008	**22.7702**	Sep-2012	**12.0782**
Feb-2004	**12.2366**	Jun-2008	**22.5033**	Oct-2012	**11.9460**
Mar-2004	**13.6698**	Jul-2008	**22.2353**	Nov-2012	**11.8156**
Apr-2004	**13.8045**	Aug-2008	**21.9669**	Dec-2012	**11.6872**

	Larson Model
Time	Amity Canal
Jan-2013	**11.5611**
Feb-2013	**11.4371**
Mar-2013	**11.3148**
Apr-2013	**11.1945**
May-2013	**11.0760**
Jun-2013	**10.9594**
Jul-2013	**10.8448**
Aug-2013	**10.7313**
Sep-2013	**10.6204**
Oct-2013	**10.5107**
Nov-2013	**10.4028**
Dec-2013	**10.2964**
Jan-2014	**10.1917**
Feb-2014	**10.0887**
Mar-2014	**9.9870**
Apr-2014	**9.8871**
May-2014	**9.7882**
Jun-2014	**9.6911**
Jul-2014	**9.5954**
Aug-2014	**9.5010**
Sep-2014	**9.4083**
Oct-2014	**9.3164**
Nov-2014	**9.2263**
Dec-2014	**9.1374**
Jan-2015	**9.0496**
Feb-2015	**8.9636**
Mar-2015	**8.8781**
Apr-2015	**8.7939**
May-2015	**8.7111**
Jun-2015	**8.6296**
Jul-2015	**8.5488**
Aug-2015	**8.4694**
Sep-2015	**8.3914**
Oct-2015	**8.3140**
Nov-2015	**8.2380**
Dec-2015	**8.1629**
Jan-2016	**8.0887**
Feb-2016	**8.0160**
Mar-2016	**7.9436**
Apr-2016	**7.8725**
May-2016	**7.8024**
Jun-2016	**7.7331**
Jul-2016	**7.6650**
Aug-2016	**7.5978**
Sep-2016	**7.5309**
Oct-2016	**7.4656**
Nov-2016	**7.4009**
Dec-2016	**7.3368**
Jan-2017	**7.2738**
Feb-2017	**7.2118**
Mar-2017	**7.1502**
Apr-2017	**7.0894**
May-2017	**7.0298**

	Larson Model
Time	Amity Canal
Jun-2017	**6.9706**
Jul-2017	**6.9122**
Aug-2017	**6.8547**
Sep-2017	**6.7978**
Oct-2017	**6.7416**
Nov-2017	**6.6863**
Dec-2017	**6.6316**
Jan-2018	**6.5774**
Feb-2018	**6.5243**
Mar-2018	**6.4716**
Apr-2018	**6.4191**
May-2018	**6.3677**
Jun-2018	**6.3170**
Jul-2018	**6.2667**
Aug-2018	**6.2171**
Sep-2018	**6.1682**
Oct-2018	**6.1199**
Nov-2018	**6.0720**
Dec-2018	**6.0248**
Jan-2019	**5.9785**
Feb-2019	**5.9322**
Mar-2019	**5.8863**
Apr-2019	**5.8413**
May-2019	**5.7969**
Jun-2019	**5.7528**
Jul-2019	**5.7096**
Aug-2019	**5.6667**
Sep-2019	**5.6241**
Oct-2019	**5.5822**
Nov-2019	**5.5407**
Dec-2019	**5.4995**
Jan-2020	**5.4590**
Feb-2020	**5.4193**
Mar-2020	**5.3796**
Apr-2020	**5.3401**
May-2020	**5.3016**
Jun-2020	**5.2632**
Jul-2020	**5.2253**
Aug-2020	**5.1879**
Sep-2020	**5.1510**
Oct-2020	**5.1140**
Nov-2020	**5.0782**
Dec-2020	**5.0422**
Jan-2021	**5.0068**
Feb-2021	**4.9719**
Mar-2021	**4.9374**
Apr-2021	**4.9030**
May-2021	**4.8691**
Jun-2021	**4.8358**
Jul-2021	**4.8028**
Aug-2021	**4.7697**
Sep-2021	**4.7372**
Oct-2021	**4.7052**

	Larson Model
Time	Amity Canal
Nov-2021	**4.6733**
Dec-2021	**4.6421**
Jan-2022	**4.6108**
Feb-2022	**4.5802**
Mar-2022	**4.5497**
Apr-2022	**4.5196**
May-2022	**4.4898**
Jun-2022	**4.4604**
Jul-2022	**4.4310**
Aug-2022	**4.4024**
Sep-2022	**4.3737**
Oct-2022	**4.3455**
Nov-2022	**4.3175**
Dec-2022	**4.2898**
Jan-2023	**4.2623**
Feb-2023	**4.2351**
Mar-2023	**4.2083**
Apr-2023	**4.1818**
May-2023	**4.1554**
Jun-2023	**4.1291**
Jul-2023	**4.1036**
Aug-2023	**4.0781**
Sep-2023	**4.0525**
Oct-2023	**4.0275**
Nov-2023	**4.0026**
Dec-2023	**3.9783**
Jan-2024	**3.9541**
Feb-2024	**3.9298**
Mar-2024	**3.9060**
Apr-2024	**3.8825**
May-2024	**3.8590**
Jun-2024	**3.8358**
Jul-2024	**3.8130**
Aug-2024	**3.7903**
Sep-2024	**3.7679**
Oct-2024	**3.7455**
Nov-2024	**3.7234**
Dec-2024	**3.7017**
Jan-2025	**3.6801**
Feb-2025	**3.6588**
Mar-2025	**3.6371**
Apr-2025	**3.6165**
May-2025	**3.5956**
Jun-2025	**3.5747**
Jul-2025	**3.5548**
Aug-2025	**3.5339**
Sep-2025	**3.5140**
Oct-2025	**3.4942**
Nov-2025	**3.4744**
Dec-2025	**3.4549**
Jan-2026	**3.4358**
Feb-2026	**3.4167**
Mar-2026	**3.3972**

	Larson Model
Time	**Amity Canal**
Apr-2026	**3.3789**
May-2026	**3.3601**
Jun-2026	**3.3418**
Jul-2026	**3.3234**
Aug-2026	**3.3051**
Sep-2026	**3.2874**
Oct-2026	**3.2691**
Nov-2026	**3.2514**
Dec-2026	**3.2342**
Jan-2027	**3.2169**
Feb-2027	**3.1996**
Mar-2027	**3.1824**
Apr-2027	**3.1658**
May-2027	**3.1489**
Jun-2027	**3.1320**
Jul-2027	**3.1159**
Aug-2027	**3.0994**
Sep-2027	**3.0832**
Oct-2027	**3.0674**
Nov-2027	**3.0516**
Dec-2027	**3.0354**
Jan-2028	**3.0200**
Feb-2028	**3.0046**
Mar-2028	**2.9892**
Apr-2028	**2.9741**
May-2028	**2.9587**
Jun-2028	**2.9436**
Jul-2028	**2.9289**
Aug-2028	**2.9146**
Sep-2028	**2.8992**
Oct-2028	**2.8852**
Nov-2028	**2.8705**
Dec-2028	**2.8569**
Jan-2029	**2.8419**
Feb-2029	**2.8287**
Mar-2029	**2.8151**
Apr-2029	**2.8000**
May-2029	**2.7868**
Jun-2029	**2.7736**
Jul-2029	**2.7603**
Aug-2029	**2.7471**
Sep-2029	**2.7339**
Oct-2029	**2.7207**
Nov-2029	**2.7074**
Dec-2029	**2.6942**
Jan-2030	**2.6810**
Feb-2030	**2.6689**
Mar-2030	**2.6567**
Apr-2030	**2.6435**
May-2030	**2.6310**
Jun-2030	**2.6193**
Jul-2030	**2.6064**
Aug-2030	**2.5950**

	Larson Model
Time	**Amity Canal**
Sep-2030	**2.5826**
Oct-2030	**2.5708**
Nov-2030	**2.5590**
Dec-2030	**2.5469**
Total	**3361.2783**

APPENDIX A.4

Agreement Not To Terminate The Offset Account Resolution For A Specified Period And Related Matters

This Agreement is entered into by the State of Colorado and the State of Kansas ("States").

Recitals

WHEREAS, the Arkansas River Compact Administration ("Administration") adopted a Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping dated March 17, 1997, as amended twice on March 30, 1998 ("Offset Account Resolution") (Appendix L to the current draft Judgment and Decree in *Kansas v. Colorado*, No. 105, Original, U.S. Supreme Court) ("draft Decree"), establishing an Offset Account in John Martin Reservoir for Colorado Pumping ("Offset Account"); and

WHEREAS, paragraph 17.A of the Offset Account Resolution provides that either State, through its Compact delegation, may terminate the Offset Account Resolution effective March 31 by giving written notice to the Administration by February 1 of the same Compact year; and

WHEREAS, the States have entered into a Stipulation Re Offset Account in John Martin Reservoir filed April 3, 1997, and approved by Special Master Arthur L. Littleworth (Appendix F.1 to the draft Decree) and have entered into agreements

concerning the determination of credits, transit losses, and evaporation credits for water stored and released from the Offset Account; and

WHEREAS, both States derive benefits from the Offset Account.

Agreement

NOW, THEREFORE, during the term of this Agreement, the States agree as follows:

1. Right to Terminate the Offset Account.

The States will not exercise their right to terminate the Offset Account Resolution pursuant to paragraph 17.A of the Offset Account Resolution.

2. Use of the Offset Account.

The Colorado State Engineer and the Division Engineer for Water Division 2 will require well users subject to Rules 3 and 4, except for well users subject to Rule 4.1.b, of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado ("Use Rules") (Exhibit J.1 to the draft Decree), and ground water users with Post-1985 structures or uses located downstream of John Martin Reservoir that are included in the LAWMA plan for augmentation decreed in Case No. 02CW181 (LAWMA Decree) to deliver replacement water to the Offset Account to replace their depletions to usable Stateline flow, to

the extent LAWMA can do so legally and physically, as a condition of approval of the annual replacement plans in accordance with the Use Rules; provided, however, that:

a. Delivery of replacement water to the Offset Account shall not be required if the Offset Account is full;

b. If the Offset Account is full, Colorado will obtain credit for the consumptive portion of the direct-flow yield of the Highland Canal water rights as input to the H-I Model as a special water at John Martin Reservoir; and

c. Delivery of replacement water to the Offset Account shall not be required for sources that are not approved to be delivered to the Offset Account pursuant to the terms and conditions of a Water Court decree or when downstream sources cannot be stored by exchange in the Offset Account because no exchange potential exists to allow upstream storage. The Keesee and Highland water rights will be used primarily to replace depletions to usable Stateline flow, but may be used to replace depletions to senior surface water rights in Colorado and shall not be used to make physical deliveries to Kansas outside of the Offset Account except as provided in paragraph 2.a and b. Accordingly, to the extent Keesee and/or Highland water rights are not needed to replace depletions to usable Stateline flow, LAWMA shall not be required to deliver these water rights to the Offset Account. Should LAWMA receive

ARCA approval to allow the Keesee water rights to be delivered to the Permanent Pool, that portion of the Keesee water rights delivered to the Permanent Pool would be exempt from this agreement during those times.

Replacement for depletions below the Buffalo Canal headgate during April-October and replacement for depletions downstream of John Martin Reservoir during November-March, to the extent not generated by direct flow sources, or portions of direct flow sources, specifically approved by the LAWMA Decree or replacements generated by the Sisson water right operated in a manner consistent with the Stubbs portion of the LAWMA decree, shall be delivered to the Offset Account, subject to the conditions stated above.

3. Presumptive stream depletion percentage.

The Colorado State Engineer and the Division Engineer for Water Division 2 will determine stream depletions for plans required by Rules 3 and 4, except for well users subject to Rule 4.1.b, of the Use Rules using a presumptive stream depletion percentage of thirty-nine percent (39%) of the amount diverted for supplemental flood and furrow irrigation or, in the alternative, if the use of 39% is prohibited by a final Water Court order, determine stream depletions using the presumptive stream depletion percentage specified in the Use Rules for supplemental flood and furrow irrigation and, further, require well users to deliver an additional amount of water to the Offset

Account equal to the difference between 39% and the percentage specified in the Use Rules for supplemental flood and furrow irrigation; provided, further, that if a final Water Court order requires the use of a presumptive depletion percentage of more than 39% for diversions of ground water used as a supplemental supply for some but not all diversions of ground water used as a supplemental supply for flood and furrow irrigation by users in a plan approved by the State and Division Engineers under Rules 3 and 4, except for well users subject to Rule 4.1.b, then the State and Division Engineers shall determine the stream depletion percentage for all users in the plan using a weighted average and shall then require well users to deliver an additional amount of water to the Offset Account equal to the difference between 39% and the weighted average, if the weighted average is less than 39%.

4. Dispute resolution.

Disputes between Kansas and Colorado regarding inflows or credits to the Offset Account delivered pursuant to Paragraph 4 of the Offset Account Resolution will be resolved in accordance with the Fast Track Issue Resolution Procedure in the Dispute Resolution Procedure set forth in Appendix H of the draft Decree.

5. Five-year review.

The States will conduct a review of the operations of the Offset Account Resolution and the Offset Account Crediting Agreement, as well as the provisions of this Agreement, beginning no later than September 30, 2010. The review and a joint report by the States shall be completed and presented to the Administration at its December 2012 annual meeting. Notwithstanding anything in the Offset Account Crediting Agreement to the contrary, this review shall satisfy the requirements for the first 5-year review required by paragraph 11 of the Offset Account Crediting Agreement.

6. Negotiations on procedures if the Offset Account does not exist.

Not later than September 30, 2010, the States will commence work on an agreement as to how credit for direct deliveries of water to the Stateline for replacement of depletions to usable Stateline flow and to make up a Shortfall shall be determined if the Offset Account does not exist after December 31, 2012. Such an agreement shall be completed before the end of the review set forth in paragraph 5 above; provided, however, that if the States have not completed such an agreement by September 30, 2012, each State shall by October 15, 2012, submit a proposal to the other State as to how credit for such deliveries shall be determined if the Offset Account does not exist, and the procedures to determine such

credits shall be resolved under the Dispute Resolution Procedure set forth in Appendix H of the draft Decree.

7. Term of this agreement and possible extension thereof.

The term of this Agreement shall be from the date of this Agreement, as jointly approved below, until December 31, 2012. If agreed to by the States before December 31, 2012, the term of this Agreement may be extended. If this Agreement is not so extended, either State may thereafter exercise its right to terminate the Offset Account Resolution in accordance with paragraph 17.A of the Offset Account Resolution, and the provisions of paragraphs 2 and 3 of this Agreement shall be of no further force and effect.

JOINTLY APPROVED ON October 31, 2007.

STATE OF COLORADO	**STATE OF KANSAS**
/s/ David W. Robbins David W. Robbins Special Assistant Attorney General	/s/ John B. Draper John B. Draper Special Assistant Attorney General
/s/ Kenneth W. Knox Kenneth W. Knox Acting Colorado State Engineer	/s/ David W. Barfield David W. Barfield Acting Kansas Chief Engineer

APPENDIX B

H-I MODEL UPDATES AND CHANGES

APPENDIX B.1

Procedures For Annual Updates, Calculation Of Depletions And Accretions, Changes To The H-I Model, Reporting, Inspection, And Evaluation Of The Colorado Use Rules

I. Introduction

II. Definitions

III. H-I Model Data

IV. H-I Model Operation

V. Changes to H-I Model

VI. Reporting Requirement and Right of Inspection

VII. Evaluation of the Sufficiency and Administration of the Colorado Use Rules

I. Introduction

General – Compact compliance with respect to Groundwater Pumping shall be determined using the results of the H-I Model in accordance with this Judgment and Decree ("Decree").

The H-I Model shall be updated annually in accordance with the schedule specified in this Appendix B. Colorado shall be responsible for the collection and compilation of the data required for the annual updates to the H-I Model, as further specified in this Appendix B, and for creating the data input sets for the annual update to the H-I Model. Colorado shall provide to Kansas the updated input files for the H-I

Model, its H-I Model results, and backup data specified in this Appendix on or before March 31 for the preceding year. If requested at least two weeks in advance by Kansas, Colorado shall also provide on March 31 copies of raw data and other additional backup information for the data input sets requested. Colorado shall provide additional raw data and other backup within two weeks of any additional request by Kansas.

On or before May 15, Kansas shall provide Colorado with its H-I Model results for the preceding year together with any modified input files to the H-I Model. If the States agree on the H-I Model results, they shall be used to determine Compact compliance over the preceding ten years as described in Appendix A of this Decree. If the States have not reached agreement on H-I Model results by June 1, they shall proceed as required in Appendices A and H of this Decree, as a Fast Track Issue.

Notwithstanding the foregoing, unless the States otherwise agree, when final crop statistics become available, the States shall make a revised H-I Model run based on the final crop statistics.

II. Definitions

Terms related to the H-I Model are defined or described in Appendix C.1 of this Decree. The following definition is provided for use in this Appendix:

Consumable water: Water brought into the Arkansas River Basin from other river basins or water that may be consumed to extinction.

See Section V of this Decree for definitions of additional terms used in this Appendix.

III. H-I Model Data

This section describes the data currently required for annual updates to the H-I Model and the form in which input files and backup data shall be provided. All data and interpretations of data, including quantifications of consumable water, provided by Colorado are subject to the right of Kansas to object to or contest such data and interpretations of data; any disagreements about such data or interpretations of data shall be resolved as provided in Section II of this Decree.

A. Form of input files and back up data

H-I Model input files shall be provided in electronic form in the appropriate format for operation of the H-I Model. Backup data and other supporting information shall be provided in electronic form whenever possible. Whenever input files are the result of preprocessing programs, the base data and programs shall be provided. Backup data and other supporting information that do not exist in electronic form shall be provided in hard copy form.

B. The following input data and data assessments are required for the Historical run and the Compact run of the H-I Model.

1. Streamflows (Data Sets 6 through 10)

   a. Daily streamflow data for the following stream gages on Arkansas River and its tributaries:

      (1) Arkansas River above Pueblo, CO

      (2) Apishapa River

      (3) Purgatoire River at Las Animas, CO

      (4) Huerfano River

   b. Monthly streamflow data for:

      (1) Fountain Creek at Pueblo (USGS 07106500)

      (2) Pueblo waste water return (CDWR 14-620)

      (3) Salt Creek (Data prepared by Rocky Mountain Steel Mill and provided by CDWR.)

      (4) St. Charles River (USGS 07108900)

2. Monthly diversion data (Data Set 5)

   a. Riverside Dairy Ditch (CDWR 14-536)

   b. Southside Water Works (CDWR 14-590)

c. Northside Water Works (CDWR 14-589)

d. Comanche Power Plant (CDWR 14-618)

e. Bessemer Ditch (CDWR 14-533), excluding the Lake Minnequa (CDWR 14-3693) diversions or the St. Charles Mesa Water Association diversions (CDWR 14-645), or Zoeller Ditch (CDWR 14-527) or other water carried in Bessemer Ditch.

3. Daily Diversions (Data Set 17)

   a. Fort Lyon Canal

   b. Fort Lyon Storage Canal

   c. Kickingbird Canal

4. Monthly pumping for each H-I Model User (Data Set 12)

   a. Supplemental pumping

   b. Sole source pumping

5. [not used]

6. Monthly transmountain deliveries (Data Set 14)

   a. Daily transmountain deliveries for the Colorado Canal (Data Set 16), and

   b. The native component of the Twin Lakes Reservoir water delivered to the Colorado Canal (Data Set 18)

7. Climate data (Data Sets 3 and 4)
    a. Monthly precipitation data
        (1) Pueblo WSO AP (056740)
        (2) Rocky Ford (057167)
        (3) La Junta 4 NNE (054720)
        (4) Las Animas (054834)
        (5) Lamar (054770)
        (6) Holly (054076)
    b. Annual precipitation data
        (1) Trinidad FAA Airport (058434) (Aguilar prior to 2005)
        (2) Cheyenne Wells (051564)
        (3) Colorado Springs Municipal Airport (051778)
        (4) Colorado Springs Municipal Airport (051778) (Fountain prior to 1997)
        (5) Haswell (053828)
        (6) Holly (054076)
        (7) John Martin Dam (054388)
        (8) Karval (054444)
        (9) Lamar (054770)
        (10) La Junta 4 NNE (054720)
        (11) Las Animas (054834)

(12) Genoa (053258) (Limon prior to 1995)

(13) Ordway 2 ENE (056131)

(14) Pueblo Mem Airport (056740)

(15) Rocky Ford 2 SE (057167)

(16) Campo 7 S (051268) (Springfield, prior to 2002)

(17) Tacony 10 SE (058157)

(18) La Junta 20 S (054726) (Timpas prior to 1993)

(19) Walsenburg 1 NW (058781)

(20) Walsh 1 W (058793)

8. Climate Data (Daily)

Daily precipitation, maximum and minimum temperatures, daily average wind speed, daily total solar radiation, and daily average vapor pressure or dewpoint temperature (used to develop Data Set 50) (Station and CoAgMet ID)

(1) Avondale AVN01

(2) Vineland VLD01

(3) Rocky Ford RFD01

(4) Fowler FWL01

(5) La Junta LJT01

(6) Las Animas LMS01

(7) Lamar(02) LAM02

(8) Lamar (04) LAM04

(9) Holly (02) HLY02

9. Daily pan evaporation at John Martin Reservoir and Lake Meredith (Data Set 1)

10. Monthly ice cover at John Martin Reservoir (Data Set 1)

11. Crop distribution for each H-I Model User from County Agricultural Statistics, unless more detailed records are available for individual canal systems (Data Set 50)

12. Crop evapotranspiration (Data Set 50)

    a. Daily potential evapotranspiration computed for each crop included in the cropping patterns for the H-I Model Users based on the standardized form of the American Society of Civil Engineers (ASCE) Penman-Monteith equation and crop coefficients as set forth in Appendix B.2 of this Decree (used to develop Data Set 50)

    b. Monthly totals of potential evapotranspiration for each crop (Data Set 50)

c. Data integrity assessment

(1) Daily (or hourly) weather data (daily maximum and minimum air temperature, mean daily dewpoint temperature, daily maximum and minimum relative humidity, total daily solar radiation, and mean daily wind speed) shall be assessed for data integrity and corrected as needed using standardized procedures recommended in Appendices D and E of the ASCE-EWRI Report on Standardization of Reference ET Calculation (EWRI, 2004). Specifically:

(a) Solar radiation shall be compared against a standardized theoretical clear sky curve for the station and a multiplier or offset shall be applied to correct data for sensor calibration error or malfunction as warranted;

(b) Mean daily dewpoint temperature shall be compared against daily minimum air temperature to assess quality of both air temperature and humidity data and to assess the need for correction or replacement of data. The assessment shall include an evaluation of

any substantial impact on air temperature and humidity data caused by aridity of the proximate environment of the station that is commensurate with reasonable tolerances and operations practicalities as noted in the Fourth Report of the Special Master;

(c) Daily average wind speed data shall be compared among stations within the H-I Model Domain by day and month to assess reasonableness of data and occurrence of any data fallout or impact of weather station location on wind speed measurement.

(2) Data corrections

(a) Faulty or missing data identified by Colorado during the data integrity assessment or by Kansas during its review of the data shall be corrected or estimated using standard engineering principles.

(b) Faulty or missing weather data that cannot be sufficiently corrected during data integrity assessment shall be filled in using regression analysis and/or data from neighboring stations.

13. Monthly Pueblo Winter Water Storage Program deliveries from Pueblo Reservoir to each H-I Model User (Data Set 13)

14. Irrigated acreage for each H-I Model User (Data Set 49)

    a. Acreage irrigated by surface water only

    b. Acreage irrigated by ground water only

    c. Acreage irrigated by surface water and supplemental groundwater

    d. Dry-up acreage that is not irrigated and in compliance with the Administration of Parcels Claimed for Augmentation Credit Agreement (Appendix B.3 of this Decree)

15. Monthly transmountain return flows from Fountain Creek that are not stored or used for replacement of well depletions (Data Set 15)

16. John Martin Reservoir permanent pool deliveries of transmountain water (Data Set 19)

17. Monthly releases from Lake Meredith and discharges of consumable water from various canals that are exchanged to Pueblo Reservoir or reservoirs outside the H-I Model Domain (Data Sets 20 and 21)

18. Releases from Lake Meredith for irrigation use or delivery to the Great Plains Reservoirs, sales to Colorado Division of Wildlife (DOW) and Division of Parks and Outdoor Recreation (DPOR) (Data Sets 23 and 24)

19. Replacement water, Replacement operations, and other operations (Data Sets 22, 25, 26, 28, 31, and 33)

    a. Description – Replacement supplies that consist of discharges to the Arkansas River in the H-I Model Domain are represented in the H-I Model as special water inputs in the Historical run. These Replacement supplies consist of consumable water, such as transmountain water or water released from reservoirs into the H-I Model Domain. The special water inputs also include "transit loss charge credits," which are the unconsumed portion of administrative transit loss charges for Offset Account releases and deliveries of Highland Ditch shares into the Offset Account on fully consumable portions of these waters. These also include recharge credits for the Excelsior Ditch recharge project, for which the diversions have been removed from the H-I Model Domain.

b. Releases from Pueblo Reservoir

c. Releases from reservoirs upstream of Pueblo Reservoir that are passed through Pueblo Reservoir into the H-I Model Domain

d. Releases from Lake Meredith

e. Releases from John Martin Reservoir Section II accounts for Replacement

f. Highland Ditch transit loss credit

g. A portion of Offset Account release transit losses to be included in the H-I Model in accordance with the Offset Account Crediting Agreement (Appendix F.2 of this Decree)

h. Recharge credits for Excelsior Ditch recharge project

C. The following additional data shall be provided to Kansas:

1. Daily streamflows for the stream gages on the Arkansas River between Pueblo Reservoir and the Stateline;

2. Daily diversions for each H-I Model User;

3. Monthly end-of-month storage for each off-stream reservoir simulated in the H-I Model.

D. Revisions to change provisional data to final data

When the annual update to the H-I Model is being performed, final precipitation data obtained from the National Weather Service and final streamflow data obtained from the USGS and the Colorado Division of Water Resources (CDWR) shall be used in place of provisional data used in the previous year's annual update to the H-I Model, but such changes will not change the H-I Model results for the previous year. These data revisions may affect the values in Data Set 3 (Monthly Precipitation), Data Set 4 (Annual Precipitation), Data Set 7 (Daily Streamflow for Apishapa River), Data Set 8 (Daily Streamflow for Purgatoire River), Data Set 9 (Daily Streamflow for Huerfano River), and Data Set 10 (Daily Streamflow for Arkansas River above Pueblo). Any revisions to provisional precipitation and streamflow data for the previous year shall be incorporated into the appropriate H-I Model data sets for the calculation of accretions and depletions to Usable Stateline Flow for the year being updated.

The H-I Model data sets that contain revisions to provisional data for the previous year shall be provided, along with the documentation to support the revisions, at the time the other updated data is provided in accordance with the schedule in Section I of this Appendix.

Any revisions to the input data for the previous year will be allowed to affect the depletions and accretions to Usable Stateline Flow determined for the year being updated. However, once the annual depletion or accretion to Usable Stateline Flow is determined for the year being updated, this annual value will not be changed when the H-I Model is updated for the following year even if provisional precipitation and streamflow data have been revised. Thus, revised precipitation and streamflow data for the previous year will only affect the H-I Model results for the year being updated and for subsequent years.

IV. H-I Model Operation

A. The H-I Model shall be used to determine monthly Stateline flows for the Historical run and the Compact run.

B. The H-I Model runs shall be made with the following model switch settings:

1. Historical Run

    a. Pumping – Historical

    b. 1980 Plan – On

    c. Winter Water Storage Program – On

    d. Transmountain Water Deliveries – On

2. Compact Run

    a. Pumping – Pre-Compact

    b. 1980 Plan – On

    c. Winter Water Storage Program – On

    d. Transmountain Water Deliveries – Off

C. Monthly Usable Stateline Flow for the Historical and Compact runs shall be determined using the Durbin usable flow method with the Larson coefficients, as set forth in Appendix C.2 of this Decree. Monthly depletions (positive) or accretions (negative) to Usable Stateline Flow shall be computed as the monthly Usable Stateline Flow for the Compact run minus the comparable monthly Usable Stateline Flow for the Historical run. A monthly depletion to Usable Stateline Flow results when the predicted monthly Usable Stateline Flow in the Compact run exceeds the predicted monthly Usable Stateline Flow in the Historical run. A monthly accretion to Usable Stateline Flow results when the predicted monthly Usable Stateline Flow in the Historical run exceeds the predicted monthly Usable Stateline Flow in the Compact run.

D. The H-I Model results for annual depletions or accretions to Usable Stateline Flow shall be computed as the sum of the monthly Usable Stateline Flow depletions (positive values) and accretions (negative values) for each year.

E. Analysis for the limit on accretions shall be done in accordance with the Limitation on Accumulation of Credits Agreement (Appendix D of this Decree).

V. Changes to the H-I Model

Subject to compliance with the requirements of paragraph V.C of this Appendix, either State may propose changes to the H-I Model at any time. Annual updates of the update.dat file from sources of data used in preceding years shall not be considered changes to the H-I Model for the purposes of this Section V. In addition, code changes to the H-I Model necessary only to add data for annual updates shall not be considered changes to the H-I Model for the purposes of this Section V.

A. Classification of and standards for changes to the H-I Model and pre-processors:

Non-Substantive Changes to the H-I Model and pre-processors are changes that do not affect the quantification of annual depletions or accretions to Usable Stateline Flow, except as provided below in this paragraph, but which improve the efficacy of model input, model output, or model execution. The addition of a new Replacement source is considered a non-substantive change, even if code changes are required.

Substantive Changes to the H-I Model and pre-processors are any changes that are not non-substantive as defined above.

Substantive Changes to the H-I Model and pre-processors shall be permitted only to the extent that the change improves the accuracy or reliability of the model.

B. Recalibration of the H-I Model

Unless the States agree otherwise, recalibration of the model will be considered under the procedures for Substantive Changes to the H-I Model. The H-I Model will be recalibrated using the 1950-1994 time period unless the States agree to use a different period or the use of a different period is approved through the Dispute Resolution Procedure. The model, using best professional judgment, shall be recalibrated as required in the future in order to produce the most reliable estimates of Stateline depletions and accretions of usable flows.

C. Proposed changes to the H-I Model, whether substantive or non-substantive, shall be submitted by one State (proposing State) to the other State (responding State) and shall include the following:

1. A narrative description of the proposed change and an explanation of the reason for the proposed change.

2. Proposed new or revised input files, model code, and/or output files.

3. For Substantive Changes, the proposing State shall submit to the responding State the following:

a. Results of H-I Model runs showing the effect of the proposed change on the model results, and

b. Information or analysis supporting the basis for the proposed change.

4. For Non-Substantive Changes, other than the addition of new Replacement sources, the proposing State shall submit results of H-I Model runs showing that the proposed change has no effect on the model results.

D. The responding State shall have six months from the date the change is proposed to review the proposed change and to provide a response to the proposing State. The response shall be in writing and shall include one or more of the following:

1. Acceptance of the proposed change.

2. Acceptance of the proposed change with modification. The response shall state the basis for modifying the proposed change and shall include the following:

a. A narrative description of the modification to the proposed change and an explanation of the reason for the proposed modification.

b. The proposed modification to the input files, model code, and/or output files.

c. For modification to a proposed Substantive Change, the responding State

shall submit to the proposing State the following:

(1) Results of H-I Model runs showing the effect of the proposed modification on the model results, and

(2) Information or analysis supporting the basis for the proposed modification.

d. For Non-Substantive Changes, other than the addition of new Replacement sources, the responding State shall submit results of H-I Model runs showing that the modification of the proposed change has no effect on the model results.

e. The proposing State shall have one month to review the proposed modification and provide a response. If the proposing State does not agree with the proposed modification, it shall so notify the responding State within one month and the matter may be submitted to the Dispute Resolution Procedure.

3. Rejection of the proposed change and an explanation of the basis for such rejection. The proposing State shall have one month to review the basis for the rejection and may submit the proposed change to the Dispute Resolution Procedure. If the proposed change is not submitted to

the Dispute Resolution Procedure, it shall be deemed rejected; provided, that such rejection shall not preclude a State from proposing the change at a future date based on further information or analysis.

E. Proposed changes to the H-I Model shall be submitted to the following, or their successors:

1. If to Colorado:

Colorado State Engineer

Division of Water Resources

Colorado Department of Natural Resources

2. If to Kansas:

Kansas Chief Engineer

Division of Water Resources

Kansas Department of Agriculture

F. Implementation of Approved Changes to the H-I Model

Unless the States agree otherwise, approved changes to the H-I Model, whether approval results from acceptance of the change, agreement of the States, or the Dispute Resolution Procedure, shall become applicable to the Annual Calculations as follows:

1. For changes to represent new Replacement sources, the change shall be applicable starting with the year in which the change is proposed, provided that the change is proposed in accordance with this Section V by March 31. Changes proposed after March 31 shall become applicable starting with the year following the year in which the change is proposed (e.g., if a change to represent a new Replacement source were proposed on April 9, 2006, it would become applicable to the Annual Calculation for the year 2007 that is performed in 2008).

2. For all other changes, the change shall be applicable starting with the year following the year in which the change is proposed (e.g., a change proposed on January 31, 2006, shall become applicable to the Annual Calculation for the year 2007 that is performed in 2008).

VI. Reporting Requirements and Right of Inspection

A. In addition to the data necessary to update the H-I Model each year, as described above in Section III, Colorado will provide monthly summaries of pumping and replacement operations under replacement plans to Kansas within 60 days after the end of each month.

B. The annual submittal for each replacement plan that includes wells in the H-I Model Domain will be provided to Kansas at the

time it is received (normally by March 1 of each year). Plan approvals will be provided to Kansas at the time of notice to the plan applicants. Plan amendments will be provided to Kansas at the time of approval.

C. Pumping data and records to be collected and provided to Kansas include:

1. Pumping Data – Power records and user reported pumping used in the monthly administration of the replacement plans in the Arkansas River Basin will be made available to Kansas each month. The data will include the power records as received from the power companies, power coefficients, and processed records to derive monthly pumping. Pumping for each irrigation well in the H-I Model Domain will be computed and made available to Kansas, including the farm unit and canal service area for each well in the H-I Model Domain. Wellhead depletions will be summarized by canal service area.

2. The forms used to report new power coefficients for each irrigation well in the H-I Model Domain using the power coefficient method will be provided to Kansas, upon request, at the time it is implemented in the accounting process to determine pumping for that well.

3. The CDWR records of flow meter readings will be made available to Kansas.

D. Colorado shall provide or make available the following data for irrigated acreage that will be dried up for Replacement credit and for direct delivery of Replacement water.

1. Dry-up of irrigated acreage by water rights that are proposed for Replacement will be determined using the procedures in the Administration of Parcels Claimed for Augmentation Credit Agreement (Appendix B.3 of this Decree). Colorado shall provide the following information:

   a. Acreage historically irrigated that was not irrigated from any source during the plan year.

   b. Acreage historically irrigated that was irrigated with ground water during the plan year.

   c. Acreage historically irrigated that was irrigated with transmountain water or other consumable water (for revegetation purposes only) during the plan year.

   d. Documentation of monitoring of dry-up during the season; field reports, interview notes and photographs.

   e. Mapping of acreage actually approved for dry-up.

2. Records of daily diversions and Replacement releases for each canal for which Replacement credit is claimed and operated during the year.

3. The portion of Replacement releases that were allocated to replace depletions under Substitute Water Supply Plans for post-1985 pumping.

E. Colorado shall provide or make available on a monthly basis, unless otherwise specified below, the following data for Replacement supplies delivered to the river:

1. Records of releases of transmountain or other consumable water from reservoirs in the H-I Model Domain to the Arkansas River or from the reservoirs outside the H-I Model Domain into the H-I Model Domain will be maintained and provided to Kansas. These records will include:

a. The location, amount, and time of release. The time of release will include the date(s) of release.

b. The source of water (e.g., transmountain, transmountain return flow, Colorado Canal consumable) and the entity that provided the water.

c. The well group and wells for which Replacement was supplied.

d. Reservoir records sufficient to document that the release operation occurred.

e. Documentation of the determination of the consumable portion of the water if the water was not fully consumable.

f. Documentation of any releases made to maintain historical return flows.

g. Identification of amounts that were allocated for depletions not included in the H-I Model analysis, such as municipal well depletions or use upstream of Pueblo.

2. Deliveries of Replacement water from Fountain Creek or other tributaries.

a. Summary of Fountain Creek accounting to document the timing and amount of transmountain or other consumable water that was not stored or exchanged to upstream storage.

b. Computed depletions and replacement for Rule 14 wells on Fountain Creek.

F. Irrigated Acreage

1. Groundwater acreage will be based on the Colorado farm verification program. Groundwater acreage will be based on the acreage in each farm unit for which pumping occurred during the season unless the farm unit has documented surface-water-only acreage, subject to

paragraphs to 2 and 3 below. Acreage for any pumping from wells not in a farm unit will be quantified and included.

2. Each farm unit for which surface-water-only acreage is claimed will be verified at least once every five years.

3. Irrigated acreage will be updated in accordance with the Irrigated Acreage Updating Agreement (Appendix B.4 of this Decree). Fallow lands can be updated each year if a field survey or air photograph analysis is made to substantiate that land was not irrigated. Such land is not considered dry-up for purposes of Replacement, but is considered not irrigated in the Historical and Compact runs of the H-I Model.

G. Right of inspection

1. Colorado will provide the following documentation for inspection by Kansas upon request:

   a. Decrees approving changes of water rights and studies or analyses of Replacement sources on which approval of replacement plans were based

   b. Power and flow meter records

   c. Canal, ditch, or other surface water diversion records

   d. Canal, ditch, or other surface water measurements

e. Reservoir storage and release records

f. Irrigated acreage

g. Replacement plan accounting

h. Any other data noted in this or other Appendices of this Decree to the extent such data are maintained by the Colorado Division of Water Resources

2. Kansas shall have the right to inspect diversion works and augmentation facilities, irrigated and fallowed lands, and acreage dried up for replacement plans in the H-I Model Domain, either accompanied by Colorado State officials or unaccompanied.

   a. Accompanied – reasonable and mutually acceptable schedule among representative State and/or federal officials.

   b. Unaccompanied – Kansas inspection parties shall comply with all Colorado laws and regulations when making inspections. Kansas inspection parties do not have the right of access to private property when not accompanied by Colorado officials.

VII. Evaluation of the Sufficiency and Administration of the Colorado Use Rules

In accordance with Section IV of this Decree, the administration of the Colorado Use Rules during the period 1997 through 2006 and the sufficiency of the Colorado Use Rules shall be evaluated. The H-I Model as documented in Appendix C.1 of this Decree shall be used as part of that evaluation. The evaluation of the sufficiency of the Colorado Use Rules and their administration shall include (1) an evaluation of the adequacy of the presumptive depletion percentages of 30%, 50%, and 75% as set out in Colorado Use Rule 4.2 without any consideration of adjustments to the replacement requirements under the Colorado Use Rules or any voluntary Replacement, and (2) an evaluation of any adjustments to replacement requirements under the Colorado Use Rules during the 1997 through 2006 period.

APPENDIX B.2

Agreement On Potential Evapotranspiration As Used In The H-I Model

This agreement on potential evapotranspiration (PET) as used in the H-I Model addresses various computation procedures agreed to by the States for PET values as described below and a method for calibrating SCS Blaney-Criddle values at Lamar and Holly in the future.

1. The Penman-Monteith method as used in this agreement refers to the final published version of the ASCE Standardized Penman-Monteith Equation for computation of alfalfa reference crop evapotranspiration coupled with crop coefficients (alfalfa reference ET basis) to compute crop ET. Normalized crop coefficient (K_c) values submitted by Kansas at trial in 2002 will be used to update PET values for update to the H-I model for 1997-2006. The SCS Blaney-Criddle method as used in this agreement refers to the modified SCS Blaney-Criddle method to directly estimate monthly crop consumptive use. NOAA weather station data will be used for calculations with the SCS Modified Blaney-Criddle, only. All calculations with Penman-Monteith will be based on CoAgMet weather data.

2. The two states will cooperate in the siting of weather stations and the determination of QA/QC adjustments of weather data necessary in calculating PET for input to the H-I Model. QA/QC adjustments will include

corrections for impacts of tall vegetation in the vicinity of the weather station, if necessary.

3. PET values upstream of John Martin Reservoir, for the period 1950-2006, will be computed as follows:

   a. For the period 1950-1993: use the ratios presented by Kansas at trial in 2002 for calibrating the SCS Blaney-Criddle method to the Penman-Monteith method (based upon 1994-99 average monthly calibration ratios computed with the combination of the Avondale/Vineland CoAgMet with the Pueblo NOAA station; and the 1993-99 average monthly calibration ratios computed with the combination of Rocky Ford CoAgMet with the Rocky Ford NOAA station).

   b. For the period 1994-2004: directly compute Penman-Monteith crop PET values using the Avondale/Vineland and Rocky Ford CoAgMet weather stations.

   c. For the period 2005-2006: directly compute Penman-Monteith crop PET values using the data for additional CoAgMet weather stations that may be installed and data available. Data is anticipated to be available from the following CoAgMet sites: Avondale/Vineland, Fowler 01, Rocky Ford 01, La Junta 01, Las Animas 01. The States will jointly develop and agree to a new assignment schedule for distributing ditch (user) service areas to each weather station.

4. PET values downstream of John Martin Reservoir for the period 1950-2006 will be computed as follows:

   a. For the period 1950-2002: use the extrapolated ratios presented by Kansas at trial in 2002 for calibrating the SCS Blaney-Criddle method at the Lamar and Holly NOAA sites to Penman-Monteith method.

   b. For the period 2003-2004: directly compute Penman-Monteith crop PET values, using the Lamar02 CoAgMet weather station and use as representative for the entire area downstream of John Martin Reservoir.

   c. For the period 2005-2006: directly compute Penman-Monteith crop PET values, using the Lamar04/Lamar02 and Holly02 CoAgMet weather stations.

5. At the end of 2007, 5 years of overlapping climate data record from the Lamar CoAgMet weather station, a combination of Lamar 02 (2003-2004) and Lamar 04 (2005-2007), and from the Lamar NOAA station (2003-2007) will be used to compute new monthly average calibration factors for calibrating the SCS Modified Blaney-Criddle PET computed at the Lamar NOAA station to the Penman-Monteith method. The new calibration ratios will be for the purpose of recalculating the PET for the areas assigned to the Lamar NOAA station for the period 1950-2002.

6. At the end of 2007, 5 years of overlapping climate data record from the Lamar02 and Holly02 CoAgMet weather stations, a combination of Lamar 02 (2003-2004) and Holly02 (2005-2007), and from the Holly NOAA station (2003-2007) will be used to compute new monthly average calibration factors for calibrating the SCS Modified Blaney-Criddle PET computed at the Holly NOAA station to the Penman-Monteith method. The new calibration ratios will be for the purpose of recalculating the PET for the areas assigned to the Holly NOAA station for the period 1950-2002.

7. At the end of 2009, 5 years of overlapping climate data record from the Holly02 CoAgMet weather station (2005-2009), and from the Holly NOAA station (2005-2009) will be used to compute new monthly average calibration factors for calibrating the SCS Modified Blaney-Criddle PET computed at the Holly NOAA station to the Penman-Monteith method. These new calibration ratios will be compared to those developed in (6) and adjustments made as needed, and are for the purpose of recalculating the PET for the areas assigned to the Holly NOAA station for the period 1950-2002.

Signatures

/s/ Hal D. Simpson
Hal D. Simpson,
Colorado State Engineer

Date: 9-30-05

/s/ David L. Pope
David L. Pope, Kansas
Chief Engineer

Date: 9-30-2005

APPENDIX B.3

Administration Of Parcels Claimed For Augmentation Credit Agreement

This Agreement is entered into by the State of Colorado and the State of Kansas to resolve issues relating to the administration of parcels claimed for augmentation credit.

Colorado and Kansas agree as follows:

1. In reviewing and approving replacement plans, submitted pursuant to the Colorado Use Rules, the Colorado State Engineer and the Division Engineer for Water Division 2 shall use the procedures attached hereto as Exhibit A for dry-up of irrigated acreage by water rights that are proposed for use as augmentation water.

2. The Colorado State Engineer and the Division Engineer for Water Division 2 shall use the procedures attached as Exhibit A for monitoring and documentation of dry-up acreage by water rights in approved replacement plans.

3. The State of Kansas will be provided with mapping of the dry-up acreage in an agreeable GIS format by April 15th of each year, or at a later time with appropriate notice. In addition, Kansas will be provided with copies of documentation resulting from dry-up monitoring and documentation upon request. A summary table listing all dry-up tracts with any problems found, adjustments to acreage or credits, or other changes from the plan approvals,

will be generated at the end of each year. The States will jointly cooperate to ensure information is exchanged on a timely basis to resolve concerns associated with the dry-up acreage as they are discovered.

4. This agreement does not preclude changes to the monitoring and documentation procedures attached as Exhibit A that either State believes are necessary or appropriate in the future. The Colorado State Engineer and the Kansas Chief Engineer and their staffs agree to work cooperatively in the event such changes are proposed.

5. Any disagreements **of parcels claimed for augmentation credit** will be subject to the Dispute Resolution Process included in the final decree in *Kansas v. Colorado*.

6. The agreement to use the procedures attached as Exhibit A resolves Issue (b)13.c.3 of the Jointly Proposed Schedule to Resolve Issues That Remain After the Supreme Court's Opinion As of March 11, 2005 in *Kansas v. Colorado,* No. 105, Original.

JOINTLY APPROVED: 9-30-2005

/s/ Hal D. Simpson	/s/ David L. Pope
Hal D. Simpson	David L. Pope
Colorado State Engineer	Kansas Chief Engineer

EXHIBIT A
TO
APPENDIX B.3

Operating Procedures For Administration Of Parcels Claimed For Augmentation Credit

Plans Approved by the Colorado State Engineer
Pursuant to the Amended Rules and
Regulations Governing the Diversion and
Use of Tributary Ground Water in the
Arkansas River Basin, Colorado

September 2005

I. Selection and Approval of Parcels for Augmentation Credit

A. Colorado's Evaluation of Acreage

The Colorado Division of Water Resources (CDWR) has conducted several studies of irrigated lands in the Lower Arkansas Basin over a period of several decades. During the Kansas v. Colorado court case George Moravec developed mapping of irrigated acreage and assignments to ditch service areas using 1985 aerial photos for the area between Pueblo and the Kansas-Colorado stateline. Similarly, Spronk Water Engineers evaluated 1980 aerial photos for the State of Kansas and developed mapping of irrigated lands in the same area. Experts also reviewed historic aerial photos and data to assess changes in acreage during the period just prior to the Arkansas River Compact through 1980.

In 1998 and again in 2002 and 2003, the CDWR conducted studies of irrigated lands in the same areas using satellite imagery to classify irrigated and non-irrigated lands. Additionally, the CDWR has developed an ongoing data collection system to determine the lands irrigated by wells as a sole source of supply or as a supplemental source to surface water by conducting farm verification interviews each winter with farm operators in the lower basin. The work done by Colorado to identify and map irrigated lands has been critiqued by Kansas and by Colorado water right owners and ditch companies and corrected as applicable.

The Colorado State Engineer believes that the result of these studies is a comprehensive set of mapping that should be relied upon for evaluating claims for augmentation credit derived from the removal of pre-compact water rights for replacement of stream depletions caused by post-compact well pumping.

B. Nomination of Parcels for Dry-up Credits in Replacement Plans

Beginning with the 2006-07 Replacement Plan year, plan proponents will need to select parcels for dry-up credit utilizing the mapping developed by the CDWR for any dry-up credit to be claimed under the provisions of Rule 6 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado (Amended Use Rules). The CDWR mapping will include areas shown as irrigated in either the 1985 aerial photos evaluated by Colorado or the 1980 aerial photos evaluated by Kansas. Parcels identified within this mapped area that have not had shares moved to different locations will be eligible for dry-up crediting under Rule 6 provisions.

Mapped parcels shall be provided in GIS format compatible with the ArcView software used by the CDWR unless provisions are made to coordinate mapping with the Division 2 Office in Pueblo. Mapping for nominated parcels must be provided with the March 1, 2006 Replacement Plan submittals in order to ensure timely approval of replacement sources for the 2006-07 Plan Year and by March 1st of each succeeding plan year.

Example of CDWR Mapping

Plan proponents seeking to nominate any lands they believe were historically irrigated that do not lie within the mapped irrigated lands developed by the CDWR must seek a change of water right for the associated shares in Division 2 Water Court prior to approval in any plan approved pursuant to the Amended Use Rules.

C. Minimum Standards for Parcel Selection

Dry-up parcels must be at least five acres unless they comprise all of an existing DWR parcel that is already less than five acres. Parcels that represent a portion of an existing field can only be split with the

direction of historic irrigation unless a means of physical separation is approved by the Division Engineer. A physical separation must exist between any irrigated portion of a parcel and the dry-up portion unless prior approval by the Division Engineer's Office is received. Waiver of the physical separation criteria will only occur for areas adjacent to sprinkler or drip systems and not for flood and furrow irrigation. For dry-up fields left fallow or with a dryland cover crop without permanent root system (that is, not alfalfa or pasture grass for example), the separation can be a ditch or tilled strip at least ten feet in width that prevents irrigation application from reaching the dry-up parcel. For partial fields containing deep-rooted crops such as alfalfa or pasture grass a deep tilled separation of at least 25 feet must be maintained along with any ditches necessary to ensure no irrigation application to the dry-up portion. For any dry-up parcel that is planted with a dryland crop (haygrazer, milo, millet, etc.), the crop should either be drilled at an angle to normal irrigation direction or a tilled strip maintained at the top of the field that clearly separates the crop from any possible irrigation source (preferably both).

Example of Physical Separation Between Irrigated Parcel and Dry-up Parcel

Example of Tilled Strip at Dry-up Parcel Header for Dryland Crop

D. Dry-up Parcels Irrigated by Sole Source Wells

For any parcel from which surface water has been removed and claimed for augmentation credit, but which will be irrigated by a sole source well (e.g. drip systems or sprinkler systems or sole source flood), the following information must be provided with each March 1st Plan submittal:

1. Well ID Number(s) serving the parcel

2. Method of irrigation (Drip, Sprinkler, Flood, Etc.)

3. Description of how parcel will be separated from surface water irrigation and storm runoff from areas adjacent to the parcel

    a) Removal of header ditch

    b) Plug in header ditch or in feeder from surface water lateral

    c) Other method (describe)

E. Parcels Formerly Containing Alfalfa or Alfalfa-Grass Stands

Beginning with the 2006-07 Replacement Plan Year parcels containing alfalfa or mixed alfalfa stands must be deep tilled or chemically killed by no later than April 1st of each Plan Year unless the CDWR field staff have inspected the parcel and the Division Engineer has agreed that the alfalfa stand will not produce any significant growth due to either precipitation or

sub-irrigation. Notwithstanding these provisions, for any parcel that exhibits sustained growth (i.e. plant growth to a height of more than 6 inches) during the dry-up year, the CDWR field staff shall require either immediate chemical kill or deep tillage or shall deem the parcel to be disqualified for augmentation credit.

F. Parcels with Areas of High Ground Water or Seepage

Fields containing areas of high ground water or areas effected by seepage from ditches or natural water courses, ponds or reservoirs may be disqualified or required to be chemically killed or deep tilled if significant crop growth continues to occur during the irrigation season absent irrigation supply.

G. Plan Year and H-I Model Year Dry-up Claims

Due to the conflict between Replacement Plan years (April 1st through March 31st) and H-I Modeling periods (January 1st through December 31st), replacement plan proponents shall indicate whether a dry-up claim is for the Plan Year of calendar year. For any dry-up parcel irrigated during the period January through March of any year, but nominated for dry-up credit after April 1st (e.g. winter wheat), the plan proponent must provide a consumptive use analysis consistent with the methodology used for H-I Model crediting prepared by a registered professional engineer to determine how to pro-rate the dry-up acreage

for the partial H-I Model year. This analysis must be submitted by no later than May 1st of the year in which the partial credit is being claimed. An estimate of the reduction in consumptive credit to be used in the Replacement Plan shall be provided with the March 1st plan submittal for purposes of plan evaluation and approval.

H. Mapping by Division of Water Resources for Approved Parcels

Using GIS data provided by the plan proponents, Division 2 staff will prepare dry-up shapefiles and mapping of the parcels approved in the replacement plan. This data and mapping will be used by CDWR field staff and Kansas to monitor dry-up fields. Division 2 staff will attempt to make this mapping available by April 15th of each year. Final mapping for dry-up affidavits will be produced at the conclusion of the credit period (January 15th for calendar year dry-up and April 15th for replacement year dry-up).

II. Parcel Identification

A. Parcel Identification

Parcels shall normally be identified using the Parcel ID established by CDWR unless another parcel identification system is approved by the Division Engineer. Mapping of approved parcels and data collection by CDWR field staff while monitoring parcels will rely on the Parcel ID to relate parcel information. The typical Parcel ID is in the format

Township Number, Range Number, Section Number and a two-digit field number (e.g. 21573607).

B. Physical Identification of Dry-up Parcels

1. Permanent Dry-up Parcels

For parcels that have been approved for dry-up for at least three consecutive years, or that are intended for permanent removal of all types of irrigation, a sign shall be placed in a prominent location near the most logical point of observation near a public road way or the commonly used access point to the parcel. The sign shall be securely mounted on a 4" x 4" or 6" by 6" timber post and shall be at least 9" wide by 12" high, made of durable material, and with minimum 1" lettering. Signs shall state “Dry-Up Parcel ID XXXXXXXX.”

2. Temporary Dry-up Parcels

For parcels that are nominated for only temporary dry-up (less than three consecutive years), a sign shall be placed in a prominent location near the most logical point of observation near a public road way or the commonly used access point to the parcel. The sign shall be securely mounted on a steel tee-post or 4" x 4" or 6" by 6" timber post and shall be at least 12" wide by 6" high, made of durable material, and with minimum 1" lettering.

Signs shall state:

"Dry-Up Parcel ID XXXXXXXX"
"No Irrigation"

or

"Dry-Up Parcel ID XXXXXXXX"
"Irrigated by Well ID XXXXXXX"

3. Installation of Signs

Signs shall be installed by no later than April 1st of each year and signs on permanent dry-up fields shall be inspected for damage and possible replacement by April 1st of each year. Mapping showing sign locations or GPS locations of signs shall be provided by no later than April 15th of each year.

III. Field Monitoring of Dry-up Parcels

A. Colorado Division of Water Resources' Role

Division of Water Resources field staff shall visit dry-up parcels on a periodic basis during each irrigation season to determine adequacy of dry-up provisions and sources of irrigation supply for parcels that have ongoing irrigation by sole source wells. Data will be collected for each parcel as shown on the attached field inspection form. Data collected will be maintained in the Division 2 Office and periodically provided to Kansas and interested parties upon request. Problems discovered during the periodic inspections

Dryup Field Verification Form

Date: _____ Verified By: _____

Arrival Time	DWR Parcel ID	Plan Parcel ID	Cover Vegetation Type	General Observations
GPS Point		View Type	Photo Comment	
Arrival Time	DWR Parcel ID	Plan Parcel ID	Cover Vegetation Type	General Observations
GPS Point		View Type	Photo Comment	
Arrival Time	DWR Parcel ID	Plan Parcel ID	Cover Vegetation Type	General Observations
GPS Point		View Type	Photo Comment	

will be communicated to the designated person for each plan so that the problem can be resolved or credits forfeited for the specific parcel.

Shares attributable to any parcel deemed by the Division Engineer as not actually being in a dried up condition shall be immediately removed from computations of augmentation credits.

The CDWR personnel will also conduct joint field inspections as requested with personnel from Kansas and will coordinate on communication about problems with any dry-up parcels that will affect the H-I Model input data.

B. Role of Plan Proponent and Well Owners

Each replacement plan shall designate with the March 1st Plan Application a contact person or person(s) for communications related to dry-up parcels. The contact person shall be responsible for ensuring that all mapping, signage and owner information is provided as described above. The contact person will also be responsible for contacting any owners for parcels with restricted access to arrange periodic field inspections and will be available to participate on field inspections by CDWR field staff upon request. The contact person will be responsible for communicating with owners of tracts where problems with dry-up conditions have been encountered to correct dry-up deficiencies. The plan proponent contact will also be responsible for ensuring that all dry-up affidavits are submitted in a timely manner and with

complete documentation as may be required by plan approval conditions.

Owners of dry-up parcels will be responsible for notifying CDWR when any spill or irrigation occurs on a parcel that may disqualify the parcel or portions thereof from dry-up crediting. Timely notification will facilitate remediation activities that may preserve most dry-up credit for a parcel. When required by CDWR staff to take corrective actions on a parcel the owner or contact person will prepare a report to document actions taken and submit the report to the Division 2 Office within ten days of remediation activities.

C. Resolution of Problems with Tracts

When a problem is discovered on a tract the Division Engineer or designated representative will determine whether an acreage reduction or consumptive use reduction is necessary. For parcels where dry-up has been unobtainable for the majority of a season on a discreet portion of a parcel an acreage deduction will be made for the dry-up crediting to eliminate that portion.

For parcels that experience continued growth of permanent vegetation, such as alfalfa, despite efforts to chemically kill or deep till the parcel, partial dry-up credit will only be considered if a consumptive use analysis prepared as described in Paragraph I-G above is submitted with the dry-up affidavit.

D. Dry-up Affidavits

At the conclusion of each dry-up period (either April through December or April through the following March), an affidavit shall be submitted signed by a person having knowledge of the dry-up activities and historic irrigation of the parcel. An example of the dry-up affidavit is attached. Affidavits will normally be due by January 15th for April through December dry-up or by April 15th for April through March dry-up.

Affidavits for each plan shall be submitted with a summary tabulation indicating for each parcel whether the claim is made for full credit, partial credit or whether the tract was irrigated by a sole source well. Summary tabulations shall total the claimed acreage by category under each ditch.

Affidavit of _____

(Name of individual having personal knowledge of dry up)

State of Colorado)
) SS.
County of Otero)

I _____, being sworn, state as follows:
Name

1. I am _____ (describe the position that you are in or the circumstance, which allows you to have a personal knowledge of the dry up of the parcel of land described in paragraph 3 below).

2. I reside at _____.
Address (Street/P.O., City, State ZIP)

3. The parcels of land shown on the attached map in the dried up acreage section of the Arkansas River Replacement Plan Application for *CWPDA* was irrigated by water from the Holbrook Canal prior to the dry up of the land for augmentation credit.

4. Based on my personal knowledge, the parcels of land shown on the attached map and described in the dried up acreage section of the Arkansas River Replacement Plan Application for *CWPDA* was not irrigated from the Holbrook Canal or from any other water source in 2003.

Further, the affiant sayeth not.

_____
Signature
Name _____
Address _____
_____
of Affiant

Subscribed and sworn to before me on _____
Date

My commission expires _____.
NOTARY PUBLIC

_____
Signature
Name _____
Address _____
_____

_____

APPENDIX B.4

Irrigated Acreage Updating Agreement

This Agreement is entered into by the State of Colorado and the State of Kansas to resolve issues relating to periodic updates of irrigated acreage.

Colorado and Kansas agree as follows:

1. Colorado will continue to acquire satellite imagery on a five-year cycle with the next acquisition year scheduled for 2008 in order to maintain updated mapping of irrigable and irrigated acreage. In recognition of the fact that this technology is improving and changing over time, the States agree to conduct a review of the appropriate level of detail of the imagery to obtain, and the classification alternatives and the details associated with ground truthing and reference data during the year preceding the classification year; in order to establish acceptable study parameters for each classification year. Should events occur during intervening years that the States agree could best be investigated using satellite imagery for either, the entire study area or specific portions of the study area, additional satellite imagery may be obtained and analyzed consistent with current best practices. Should the Landsat images that Colorado has relied on in the 1998 and 2003 updates be no longer available due to loss of satellite transmission or other unforeseen circumstances, the States agree to review cost effective ways to accomplish the acquisition of satellite imagery through the Arkansas River Compact Administration.

2. Colorado will continue to acquire digital aerial photographs through annual and periodic programs now being conducted by the Farm Service Agency for the U.S. Department of Agriculture. Kansas and Colorado experts will utilize updated digital aerial photography along with any data collected on parcels to document changes in irrigated lands from year to year. Changes to parcel boundaries will be periodically proposed by Colorado and reviewed by Kansas. Feedback from Kansas will be considered by Colorado and changes in the parcel boundaries as a result will be represented in the GIS database.

3. Colorado will continue their farm verification program on wells and acreage irrigated by wells. This program is set up to annually update data on a rotating basis at least once every five years for each of the wells active in replacement plans. Verification interviews will continue to be conducted at the conclusion of each irrigation season on the twenty percent of wells reviewed that year. Data from interviews will be compiled for use in preparing acreage input data sets for H-I Model runs made in each March. This data will be transmitted to Kansas for its review each year prior to March.

4. This agreement does not preclude changes to the above procedures that either State believes are necessary or appropriate in the future; but the Colorado State Engineer and the Kansas Chief Engineer and their staffs agree to work cooperatively in the event such changes are proposed and any disagreements will

be subject to the Dispute Resolution Process included in the Final Decree in *Kansas v. Colorado, Original No. 105*.

JOINTLY APPROVED 9-30-2005 :
Date

/s/ Hal D. Simpson
Hal D. Simpson
Colorado State Engineer

/s/ David L. Pope
David L. Pope
Kansas Chief Engineer

APPENDIX B.5

Sisson-Stubbs Agreement

This Agreement is entered into by the State of Colorado and the State of Kansas to resolve issues relating to the Sisson-Stubbs Ditch.

Colorado and Kansas agree as follows:

1. Want factors in the H-I Model will be calibrated such that mean diversions predicted for the period 1950-1964 will equal the mean diversions for 1949, 1951-1964, using Colorado's historical diversion records for 1950-64, except that 1949 diversions will be substituted for 1950 diversions (i.e., an average of 763 acre-feet per year.). (Table attached)

2. The acreage in the Compact run of the H-I Model will be set to 480 acres.

3. The acreages used in the historical run of the H-I Model for 1950-1996 for the Sisson-Stubbs Ditch will be left at the values that have been used by Kansas, but the acreages after 1996 will be based on 480 acres. Two hundred forty acres will be shown as dried up under the Stubbs portion of the ditch, so long as these acres remain not irrigated from any source or will be treated as sole source acreage in the H-I Model if irrigated with well water, and the balance, (currently 240 acres) will be shown as irrigated under the Sisson portion of the ditch, subject to any dry-up of that acreage. The pumping and associated acreage for the Helfrich well (Well ID 6705805),

totaling 119 acres, and any other additional acreage, will be assigned to User 24.

4. Sisson-Stubbs Section II account water can be transferred to the Offset Account in accordance with the amended Offset Account Resolution, and the model code transferring the Sisson-Stubbs Section II account water to the Kansas Transit Loss Account will be disabled after 1996. In the H-I Model, the transfer of Sisson-Stubbs Section II account water will be handled by transferring the Sisson-Stubbs Section II account water to the LAWMA Section II account as is currently done for LAWMA Section II account water transferred to the Offset Account.

5. The consumptive use credit for Sisson-Stubbs Section II account water transferred to the Offset Account will be 67.5% of the amount transferred.

6. Return flows from the Sisson-Stubbs Section II account water will be included in the H-I Model as a special water in accordance with an agreement between the Chief and State Engineers or as determined through negotiation or arbitration if the Chief and State Engineers fail to reach such an agreement.

JOINTLY APPROVED ON SEPTEMBER 23, 2005:

/s/ Hal D. Simpson	/s/ David L. Pope
Hal D. Simpson	David L. Pope
Colorado State Engineer	Kansas Chief Engineer

ATTACHMENT TO APPENDIX B.5

Monthly Diversions for Sisson Stubbs
(Acre-Feet)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1949	50	0	0	238	615	79	0	0	0	0	536	307	1,825
1951	0	0	0	397	79	0	0	0	0	0	0	0	476
1952	0	0	0	496	615	456	0	0	0	0	0	0	1,567
1953	0	0	0	0	0	180	411	369	18	0	0	0	978
1954	0	0	0	0	0	0	0	0	0	139	40	0	179
1955	0	0	0	0	0	0	56	484	79	0	0	0	619
1956	0	0	0	0	0	139	307	307	30	0	0	0	783
1957	0	0	0	0	0	0	91	260	101	0	0	0	452
1958	0	0	0	0	0	0	317	486	89	0	0	0	893
1959	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	202	357	246	0	0	0	0	0	805
1961	0	0	0	0	222	40	214	0	0	0	0	0	476
1962	0	0	0	0	0	0	0	0	0	0	139	307	446
1963	60	0	0	248	256	125	0	0	69	244	165	0	1,166
1964	0	0	0	179	173	179	184	60	0	0	0	0	774
Average	7	0	0	104	144	104	122	131	26	26	59	41	763

APPENDIX B.6

Outliers Agreement

This Agreement is entered into by the State of Colorado and the State of Kansas to resolve the issue regarding the handling of outlier months for calibration purposes.

Colorado and Kansas understand that when outlier months (as that term has been used in *Kansas v. Colorado,* No. 105, Original, excluding extraordinary high flood flows in certain "outlier" months) have been removed in the monthly stream flow and diversion data in the calibration statistics developed by Kansas' experts to evaluate the calibration of the H-I Model, averages have been calculated using a weighted average to reflect that outlier months have been removed. For example, when the months of April and May 1951 are removed from the observed and predicted stream flows at the Stateline, the annual averages for Stateline flows for 1950-94 or other years have been adjusted to reflect that only 10 months of data were used for 1951.

Based on the foregoing understanding, Colorado and Kansas agree as follows:

1. For the purpose of recalibrating the H-I Model and running the model for the years 1997-2004, outlier months in the calibration statistics will be handled as Kansas' experts have handled them in the past, i.e., the same months will be excluded in the calibration statistics and the averages will be

calculated as Kansas' experts have calculated them in the past.

2. The criteria that were used to identify outlier months will be included in the H-I Model documentation developed in *Kansas v. Colorado*. The States may in the future review the predicted and observed diversions and stream flows to determine whether the months removed as outliers are consistent with the criteria or other months should be removed as outliers.

3. This agreement resolves Issue (b)12.d of the Jointly Proposed Schedule to Resolve Issues That Remain After the Supreme Court's Opinion As of March 11, 2005 in *Kansas v. Colorado,* No. 105, Original, with regard to handling of outliers for calibration purposes but does not resolve whether any other changes should be made to the observed diversion records used for calibration of the model.

JOINTLY APPROVED ON SEPTEMBER 30th, 2005:

/s/ Hal D. Simpson	/s/ David L. Pope
Hal D. Simpson	David L. Pope
Colorado State Engineer	Kansas Chief Engineer

APPENDIX B.7

Agreement Re Amended Observed Diversion Records

This Agreement is entered into by the State of Colorado and the State of Kansas ("States").

Recitals

WHEREAS, the Hydrologic-Institutional Model (H-I Model) has been developed in the course of *Kansas v. Colorado*, No. 105, Orig., U.S. Supreme Court; and

WHEREAS the H-I Model is calibrated, in part, to records of historical ("observed") diversions by canals in Colorado; and

WHEREAS, in accordance with the Amended Diversion Records Agreement dated May 4, 2006, as subsequently amended, the experts for the States have met and agreed upon changes to the observed diversion records.

Agreement

NOW, THEREFORE, the States agree as follows:

The observed diversion records to be used for any subsequent recalibration of the H-I Model shall be those contained in that certain computer file identified as "ObsDiv2007.xls," dated 2/2/2007, which computer file shall be included on the DVD attached to the Judgment and Decree in *Kansas v. Colorado*;

provided, that, in accordance with the Amended Diversion Records Agreement, any such recalibration shall not affect the H-I Model results for the years 1997-2004, as will be shown in Appendix E of the Judgment and Decree in *Kansas v. Colorado*, and *provided further* that this Agreement shall not preclude the use of a different time period for recalibration of the H-I Model or the use of observed diversion records for additional years for recalibration of the H-I Model in accordance with Section V.B of Appendix B.1 of the Judgment and Decree.

JOINTLY APPROVED ON October 31, 2007.

STATE OF KANSAS	**STATE OF COLORADO**
/s/ John B. Draper	/s/ David W. Robbins
John B. Draper	David W. Robbins
Special Assistant Attorney General	Special Assistant Attorney General
Counsel of Record	Counsel of Record

APPENDIX B.8

Agreement Re Recalibration Of The H-I Model

This Agreement is entered into by the State of Colorado and the State of Kansas ("States").

Recitals

WHEREAS, there has been a dispute between the States with regard to the recalibration of the H-I Model for purposes of determining results for the years 1997-2004 and 2005-2006; and

WHEREAS, the States submitted letters to the Special Master with regard to model recalibration on January 31, 2006 and March 23, 2006; and

WHEREAS, the States have submitted briefs to the Special Master on the recalibration of the H-I Model on June 16, 2006 and June 23, 2006; and

WHEREAS, the Special Master has issued his Order Re Amity Canal's Interception of Fort Lyon Canal Return Flows, dated March 30, 2007; and

WHEREAS, the States have agreed to use amended observed diversion records for recalibration of the H-I Model beginning in 2005, as set forth in the Agreement Re Amended Diversion Records (Appendix B.7 of the Judgment and Decree in *Kansas v. Colorado* ("Decree")); and

WHEREAS, the States and their experts have worked together to resolve remaining differences.

Agreement

NOW, THEREFORE, the States agree as follows:

1. The recalibrations of the H-I Model for purposes of determining results for the years 1997-2004 and 2005-2006 shall be those used by the States' experts to obtain the results shown in Appendix E of the Decree. The recalibration for purposes of determining results for the years 2005-2006 shall be as defined by the values for SEVs, WTFACTs, WTADDs, and the percentage of surface and groundwater Fort Lyon return flows intercepted by the Amity Canal as set forth in Exhibit A hereto.

2. The recalibration of the H-I Model used to determine results for the years 2005-2006 shall also be used to determine results for the years 2007 and thereafter, unless the States agree otherwise or the H-I Model is recalibrated pursuant to the provisions of Section V.B of Appendix B.1 of the Decree

JOINTLY APPROVED on October 31, 2007.

STATE OF KANSAS

/s/ John B. Draper
John B. Draper
Special Assistant
Attorney General
Counsel of Record

STATE OF COLORADO

/s/ David W. Robbins
David W. Robbins
Special Assistant
Attorney General
Counsel of Record

EXHIBIT A TO APPENDIX B.8
Calibration Factors, H-I Model (2005-2006)

SEV Factors

Upstream SEV (Users 1-14) 0.24
Downstream SEV (Users 15-24) 0.11

Amity Interception of Ft. Lyon Return Flows

% Surface Returns Intercepted 100%
% GW Returns Intercepted 4%

Want Factors

Ditch	Factor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bessemer	WTADD	15.8	36.3	120.2	208.8	0.0	0.0	0.0	0.0	0.0	158.3	121.2	58.0
	WTFACT				1.80	2.14	1.49	1.51	2.50	2.38	0.74		
Booth Orchard	WTADD	1.1	3.8	22.9	33.7	0.0	0.0	0.0	0.0	0.0	30.8	22.1	4.6
	WTFACT				2.71	3.49	1.83	1.82	2.87	4.37	1.18		
Excelsior	WTADD	2.3	2.1	3.2	8.0	0.0	0.0	0.0	0.0	0.0	3.8	6.7	3.6
	WTFACT				0.83	1.60	1.56	1.18	1.60	0.79	3.55		
Collier	WTADD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.9	0.2
	WTFACT				0.27	1.33	1.33	0.88	0.93	0.24	4.87		
Colorado Canal	WTADD	140.0	80.0	140.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	55.0
	WTFACT				0.50	0.85	1.51	1.06	0.89	0.24	2.02		
Rocky Ford Highline	WTADD	104.5	140.3	174.3	293.8	0.0	0.0	0.0	0.0	0.0	183.0	157.7	127.0
	WTFACT				2.60	2.83	2.06	2.13	2.62	2.41	5.00		
Oxford	WTADD	13.9	25.7	56.4	86.1	0.0	0.0	0.0	0.0	0.0	57.8	42.0	22.1
	WTFACT				3.89	3.36	2.59	2.45	2.65	4.04	5.00		
Otero	WTADD	11.3	12.1	41.7	17.4	0.0	0.0	0.0	0.0	0.0	6.3	26.4	14.9
	WTFACT				2.16	1.49	1.50	1.27	1.64	1.18	5.00		
Catlin	WTADD	90.8	141.9	243.7	307.9	0.0	0.0	0.0	0.0	0.0	235.0	183.6	120.2
	WTFACT				2.98	2.79	2.00	1.87	2.06	2.62	4.65		
Fort Lyon	WTADD	230.0	355.0	470.0	500.0	0.0	0.0	0.0	0.0	0.0	450.0	625.0	370.0
	WTFACT				1.50	1.39	1.27	1.09	1.49	2.01	4.68		

Ditch	Factor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rocky Ford	WTADD	36.6	49.4	96.4	158.0	0.0	0.0	0.0	0.0	0.0	126.4	94.7	69.4
	WTFACT				0.74	2.68	1.56	1.45	1.82	2.52	0.08		
Holbrook	WTADD	66.0	106.0	46.0	0.0	0.0	0.0	0.0	0.0	0.0	35.0	41.0	25.0
	WTFACT				3.44	2.89	2.30	2.24	4.95	2.07	5.00		
Las Animas	WTADD	18.0	25.4	57.3	88.6	0.0	0.0	0.0	0.0	0.0	91.3	76.5	33.5
Consol.	WTFACT				1.45	2.18	1.55	1.98	2.95	3.68	4.72		
Fort Bent	WTADD	0.3	1.0	4.9	54.7	0.0	0.0	0.0	0.0	0.0	38.2	13.7	2.4
	WTFACT				1.12	1.69	1.19	1.40	1.91	2.62	2.60		
Keese	WTADD	0.3	0.4	3.6	11.6	0.0	0.0	0.0	0.0	0.0	12.0	7.3	1.5
	WTFACT				1.37	1.70	0.92	1.10	1.56	2.31	3.68		
Amity	WTADD	0.9	0.0	4.0	258.9	0.0	0.0	0.0	0.0	0.0	192.8	23.4	10.8
	WTFACT				1.30	1.53	1.04	1.10	1.42	2.32	3.87		
Lamar/Manvel	WTADD	27.7	26.2	42.6	147.5	0.0	0.0	0.0	0.0	0.0	116.4	59.9	38.2
	WTFACT				1.67	2.31	1.69	1.73	2.10	3.67	3.75		
Hyde	WTADD	0.4	0.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.3
	WTFACT				0.73	0.85	0.53	0.63	0.89	1.36	2.43		
Xy Graham	WTADD	0.7	0.2	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	3.1
	WTFACT				0.88	1.04	0.65	0.68	0.99	2.15	3.51		
Buffalo	WTADD	5.9	3.7	11.4	57.8	0.0	0.0	0.0	0.0	0.0	39.2	34.0	11.5
	WTFACT				1.42	1.90	1.09	0.96	1.31	2.28	3.45		
Sisson	WTADD	0.2	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.4
	WTFACT				0.03	1.69	0.67	0.65	0.95	0.41	1.39		

APPENDIX C

H-I MODEL DOCUMENTATION (W/ DVD)
AND USABLE FLOW METHODOLOGY

(Appendix C is printed separately in
Volume III of this Fifth and Final Report)

APPENDIX D

LIMITATION ON ACCUMULATION
OF CREDITS AGREEMENT

Limitation On Accumulation Of Credits Agreement

This Agreement is entered into by the State of Colorado and the State of Kansas to resolve the issue relating to a limitation on the accumulation of credits for accretions to usable Stateline flows determined using the Hydrologic-Institutional (H-I) Model and the Durbin usable flow method with the Larson coefficients.

Recitals

1. Colorado and Kansas understand that there is a possibility in wet years that the City of Colorado Springs and other Colorado water users may not be able to control transmountain return flows, such as transmountain return flows from Fountain Creek (H-I Model Data Set 15), or other consumable water. Such transmountain or other consumable water which is not part of an approved replacement plan but is represented in the Historic run of the H-I model and removed from the Compact run (not including irrigation return flows from the use of transmountain water which have not been allocated or sold to well users or augmentation entities or replacement water that has been delivered to the Offset Account and subsequently delivered to the Stateline) are referred to herein as "Spills or Releases." Such Spills or Releases are represented in the H-I model using a special water input data set or sets, and there is a possibility that an accretion to usable Stateline flows in wet years as the result of such Spills or Releases

could be carried over to offset depletions to usable Stateline flows in a subsequent dry year under the ten-year accounting for determining compact compliance to be included in the Judgment and Decree to be entered in this case.

2. Colorado and Kansas have agreed that the H-I model will be used each year to update the estimate of depletions/accretions to usable Stateline flows for the previous ten year period.

Agreement

In order to address the concern expressed above in the first Recital paragraph, Colorado and Kansas agree as follows:

1. Upon completion of the annual update runs of the H-I model, the annual depletions/accretions for the most recent year in the ten-year accounting period will be evaluated. If there is not an annual accretion to usable Stateline flows for that year, no further action is required under this agreement.

2. If there is an annual accretion to usable Stateline flows for the most recent year in the ten-year accounting period, the following steps will be taken:

a. Remove from the H-I model any Spills or Releases for years in the most recent ten-year accounting period and replace with zero values.

b. Rerun the H-I model to determine the annual accretion/depletion to usable Stateline flows for the most recent year in the ten-year accounting period without the Spills or Releases.

c. Compare the accretion to usable Stateline flows for the most recent year obtained using all Spills or Releases for the most recent ten-year accounting period with the accretion/depletion to usable Stateline flows obtained after the removal of the Spills or Releases. If the difference between these two quantities is greater than 3,000 acre-feet, the accretion to usable Stateline flows for the most recent year will be limited to the accretion/depletion to usable Stateline flows for the most recent year computed with none of the Spills or Releases for the previous ten-years plus 3,000 acre-feet. If the computation described in the forgoing sentence results in a depletion to usable Stateline flows, however, such depletion shall be reduced to zero acre-feet for purposes of applying this accretion limit. A table of sample computations is attached. The accretion value computed in this manner for the most recent year will be used each time that that year is included in a ten-year accounting period.

JOINTLY APPROVED ON APRIL 25, 2006:

/s/ Hal D. Simpson	/s/ David L. Pope
Hal D. Simpson	David L. Pope
Colorado State Engineer	Kansas Chief Engineer

Accretions(+)/Depletions(-) to Usable Stateline Flow
Computed for the most recent year using H-I model results

Accretions/ Computed with Spills or Releases	Accretions/ Depletions Computed w/o Spills or Releases	Difference	Is difference greater than 3,000?	Tentative accretion limit	Is tentative accretion limit less than zero?	Accretion value to be used in 10-yr accounting
5000	1000	4000	Yes	4000	No	4000
5000	3500	1500	No	5000	No	5000
200	-1000	1200	No	200	No	200
200	-4000	4200	Yes	-1000	Yes	0

APPENDIX E

TEN-YEAR ACCOUNTING DEPLETIONS
AND ACCRETIONS TO USABLE
STATELINE FLOW, 1997-2006

APPENDIX E

Ten-Year Accounting of Depletions and Accretions to Usable Stateline Flow
1997-2006

1	2	3	4	5	6	7	8	9
Year of Ten-year Cycle	Model Year	H-I Model Usable Depletion/ Accretion[1]	Offset Account Credits[2]					Remaining Usable Depletion/ Accretion[6]
			Stateline Delivery to Kansas	Evaporation Credit	Gross Credit[3]	Applied to Post-1985 Depletions[4]	Net Credit[5]	
1	1997	9,942	2,074	0	2,074	542	1,532	8,410
2	1998	2,703	0	0	0	663	-663	3,366
3	1999	-4,500	0	0	0	45	-45	-4,455
4	2000	2,022	1,277	17	1,294	964	330	1,692
5	2001	12,116	1,714	62	1,776	352	1,424	10,692
6	2002	8,525	2,098	22	2,120	222	1,898	6,627
7	2003	3,299	0	0	0	210	-210	3,509
8	2004	-3,442	6,565	1,850	8,415	260	8,155	-11,597
9	2005	-2,039	11,220	93	11,313	607	10,706	-12,745
10	2006	-1,493	8,507	0	8,507	619	7,888	-9,381
Total		27,133	33,455	2,044	35,499	4,484	31,015	-3,882
Shortfall for 2007								0

Water quantities are in acre-feet.

[1] Positive values in Columns 3 and 9 reflect depletions; negative values, accretions.

[2] Positive values in Columns 4, 5, 6, and 8 reflect credits; negative values, debits.

[3] Column 6 is the sum of Columns 4 and 5.

[4] Column 7, a positive value, is the amount of Offset Credit applied to Post-1985 depletions, determined pursuant to Appendix A.3 of this Decree

[5] Column 8 is Column 6 minus Column 7

[6] Column 9 is Column 3 minus Column 8

APPENDIX F

OFFSET ACCOUNT DELIVERY CREDITING

APPENDIX F.1

IN THE SUPREME COURT
OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, and UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105, Original October Term 1996

STIPULATION
RE OFFSET ACCOUNT IN
JOHN MARTIN RESERVOIR

(Filed Apr. 03, 1997)

This Stipulation is entered into this 17th day of March, 1997, by the State of Kansas [hereinafter "Kansas"] and the State of Colorado [hereinafter "Colorado"], subject to approval by the Special Master of the United States Supreme Court.

RECITALS:

WHEREAS, Article IV-D of the Arkansas River Compact provides as follows:

> This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoirs and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction;

and

WHEREAS, the United States Supreme Court has determined that post-Compact well pumping in Colorado has caused material depletion of the usable Stateline flows of the Arkansas River in violation of the Arkansas River Compact [hereinafter the "Compact"], *Kansas v. Colorado*, 115 S.Ct. 1733 (1995); and

WHEREAS, Colorado desires to continue to allow ground water pumping by its water users in excess of the pre-Compact entitlement of 15,000 acre-feet per year determined by the United States Supreme Court as long as any depletions to usable Stateline flows caused by such pumping are replaced; and

WHEREAS, the issue of Compact compliance by Colorado is presently pending before the Special

Master appointed by the United States Supreme Court; and

WHEREAS, an account in John Martin Reservoir [hereinafter the "Reservoir"] is not necessary for Colorado's compliance with the Compact, but an account would be of benefit to Colorado by facilitating compliance with the Compact by Colorado and its water users to the extent that Colorado allows post-Compact well pumping by its water users in excess of the pre-Compact pumping entitlement of 15,000 acre-feet per year, and Colorado has requested such an account; and

WHEREAS, the Arkansas River Compact Administration [hereinafter the "Administration"] has the authority to create the Offset Account as Provided for in the Resolution Concerning as Offset Account in John Martin Reservoir for Colorado Pumping [hereinafter the "Resolution"], but neither the Administration nor either of its member states has any obligation to create the Offset Account; and

WHEREAS, the Offset Account will create benefits for water users in Kansas but also monitoring and accounting burdens for Kansas; and

WHEREAS, the existence of an account in the Reservoir does not, in and of itself, assure Colorado's compliance with the Compact; and

WHEREAS, the Administration and the Chief of Engineers of the Army Corps of Engineers are jointly approving concurrently herewith the Resolution

Establishing a new storage account in the Reservoir known as the "Offset Account in John Martin Reservoir for Colorado Pumping" [hereinafter the "Offset Account"]; and

WHEREAS, Kansas and Colorado desire to reach an agreement of the credit which Colorado shall receive for the delivery of water released from the Offset Account upon demand by Kansas, subject to approval by the Special Master of the United States Supreme Court;

NOW, THEREFORE, Kansas and Colorado stipulate and agree as follows:

1. In accordance with the Resolution, the Colorado State Engineer shall determine the extent to which water delivered to the Offset Account is fully consumable. Colorado understands that Kansas may not agree with the Colorado State Engineer's determination and agrees that the Colorado State Engineer's determination shall not be binding on Kansas in the event of a disagreement. However, both States recognize that it is useful to have the Colorado State Engineer make the determination in the first instance. In the event that Kansas disagrees with the Colorado State Engineer's determination of the extent to which water is fully consumable, Kansas shall notify Colorado within a reasonable period of time and the States shall make a good-faith attempt to resolve the disagreement. In the event the disagreement cannot be resolved by the States, Colorado agrees that it shall have the burden to establish the

extent to which water delivered to the Offset Account is fully consumable.

2. With regard to water delivered to the Offset Account for the purpose of offsetting depletions to usable Stateline flows, which is released at the demand of Kansas pursuant to the Resolution, Colorado shall receive credit for the delivery of such water at the Stateline (less transit losses determined in accordance with paragraph 3 below) as a replacement of depletions to usable Stateline flows which occur after the effective date of the Resolution to the extent such water is fully consumable; provided, however, that a demand for a release of water from the Offset Account by Kansas shall not constitute and [an] admission by Kansas that the water released from the Offset Account and delivered to the Stateline was in fact full[y] consumable. Antecedent flows at the Stateline shall not be included in the calculated delivery. To the extent the credit for the delivery of water at the Stateline to offset depletions to usable Stateline flows exceeds calculated depletions to usable Stateline flows which occurred after the date of the Resolution, the credit shall be applied to reduce future depletions to usable Stateline flows. Colorado shall receive no credit, however, of Storage Charge Water (as defined in the Resolution) or Stateline Return Flow (as defined in the Resolution) as a replacement of depletions to usable Stateline flows.

3. Transit losses on releases of water from the Offset Account for delivery to the Stateline for the purposes of offsetting depletions to usable Stateline

flows shall be determined using the transit losses for Subreach 6, including bank and channel storage, as set forth in the U.S. Geological Survey Water Resources Investigations 78-75, unless the States agree to use a different method or the United States Supreme Court directs otherwise. The States agree to cooperate with each other, the Administration, and the U.S. Geological Survey to improve the method of determining transit losses between John Martin Dam and the Stateline. Transit losses on releases from the Offset Account for delivery to the Stateline for the purpose of offsetting depletions to usable Stateline flow shall be borne by such releases.

4. Colorado acknowledges that use of the Offset Account may result in additional monitoring costs to Kansas. Colorado agrees that Kansas is not waiving its right to claim reasonable compensation from Colorado for such additional monitoring expenses incurred by Kansas after effective date of the Resolution. Colorado shall timely share relevant information with Kansas concerning use of the Offset Account in a manner that will minimize Kansas' monitoring costs. Each year, the States shall discuss further ways to minimize such costs.

5. Neither the adoption of the Resolution nor the establishment or operation of the Offset Account shall constitute a wavier of either State's rights under the Compact (if such a waiver is possible as a matter of law) interests in present or future cases or controversies before the Administration or any court of competent jurisdiction; except that actual storage of

water in the Offset credits for deliveries of water to the Stateline in accordance with this Stipulation shall be considered in determining Colorado's Compact compliance; and provided further that Colorado shall receive credit for the delivery of water to the Stateline as a replacement of depletions to usable Stateline flows in accordance with this Stipulation.

DATED, this 17 day of March, 1997.

STATE OF KANSAS

/s/ John B. Draper
JOHN B. DRAPER
Counsel of Record
Special Assistant Attorney General

MONTGOMERY & ANDREWS, P.A.
P.O. Box 2307
Santa Fe, NM 87504-2307
Telephone: 505-986-2525

Attorneys for the State of Kansas

STATE OF COLORADO

/s/ David W. Robbins
DAVID W. ROBBINS
Special Assistant Attorney General
Counsel of Record

DENNIS M. MONTGOMERY
Special Assistant Attorney General

HILL & ROBBINS, P.C.
1441 – 18th Street, #100
Denver, Colorado 80202
Telephone: 303-296-8100

Attorneys for the State of Colorado

APPROVED:
/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

APPENDIX F.2

Agreement Concerning The Offset Account In John Martin Reservoir For Colorado Pumping, Determination Of Credits For Delivery Of Water Released For Colorado Pumping, And Related Matters

September 29, 2005

This Agreement is entered into by the State of Colorado and the State of Kansas (hereinafter referred to as "Colorado" and "Kansas") in the interests of interstate comity to resolve accounting issues relating to the Offset Account in John Martin Reservoir for Colorado Pumping (hereinafter "Offset Account"). The crediting and implementation principles described herein will be applied to Offset Account deliveries and H-I Model input sets for the years 1997 through 2004 as well as future years.

Acceptance of this Agreement by Colorado and Kansas does not prejudice or constitute a waiver of their respective rights under the Arkansas River Compact, the April 24, 1980 Resolution Concerning an Operating Plan for John Martin Reservoir (as revised on May 10, 1984, and December 11, 1984), the March 17, 1997 Stipulation Re Offset Account in John Martin Reservoir in *Kansas v. Colorado*, No. 105 Original, or the Amended March 30, 1998 Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping.

Colorado and Kansas agree as follows:

1. **Definitions: The following terms will be defined in this agreement as follows:**

   A. **Colorado Consumable Subaccount** – a subaccount of the Offset Account into which fully consumable water, as determined by the Colorado State Engineer pursuant to Paragraphs 3 and 4 of the Offset Account Resolution, is delivered or transferred. This subaccount is further segmented into:

      i. Colorado Upstream Consumable Subaccount

      ii. Colorado Downstream Consumable Subaccount.

   B. **Colorado Upstream Subaccount** – a subaccount of the Offset Account for the storage of water with the purpose of replacing depletions to conservation storage inflows pursuant to Paragraph 6 of the Offset Account Resolution.

   C. **Consumable Portion of the Release** – the water released from the Kansas Consumable and Colorado Consumable subaccounts of the Offset Account. This would not include waters released from any other subaccounts of the Offset Account.

   D. **H-I Model** – the Hydrologic-Institutional Model developed jointly by the States to assist in the determination of Stateline depletions to usable streamflows.

E. **Instate Return Flow to Colorado Ditches Subaccount** – a subaccount of the Offset Account where the water necessary to maintain historical return flows to Colorado ditches from deliveries of water historically used for agricultural irrigation is deposited.

   i. Keesee Winter Return Flows

F. **Kansas Consumable Subaccount (KCS)** – a subaccount of the Offset Account for the storage of that part of the total account for which evaporation is charged to Kansas, pursuant to Paragraph 5B of the Offset Account resolution.

G. **Kansas Storage Charge Subaccount** – a subaccount of the Offset Account for the storage of fully consumable water which is a prerequisite for Colorado or its water users to store water in the Offset Account as provided for in Paragraph 9 of the Offset Account Resolution.

H. **Kansas Stateline Return Flow Subaccount** – a subaccount of the Offset Account for those Stateline return flows which, based on historic patterns, would have been delivered to the Stateline, but which are held in the Offset Account pursuant to Paragraph 4 of the Offset Account Resolution.

I. **Muskingum Method** – a routing method as described in the following reference: McCarthy, G.T., 1938: "The Unit Hydrograph and Flood Routing," presented at conference of North Atlantic Division, U.S. Corps of Engineering,

June 1938 (see also "Engineering Construction – Flood Control," pp. 147-156, the Engineer School, Ft. Belvoir, VA, 1940).

J. **Offset Account Resolution (OAR)** – the "Resolution concerning an Offset Account in John Martin Reservoir for Colorado Pumping as amended March 30, 1998," or as it is subsequently amended.

K. **Provisional Data** – streamflow and ditch diversion data collected on the day the administrative action is taken.

L. **Reasonable Opportunity** – is the first day during the period of April 1st to June 30th when the mean Stateline daily flow is 100 cfs or greater for at least 15 days in the previous 30-day period, even if the 30 days precede April 1.

M. **Stateline Flow** – the flow of the waters of the Arkansas River as determined by gaging stations located at or near the Stateline, more specifically the combined flow as measured by USGS gaging stations: Frontier Ditch near Coolidge and the Arkansas River near Coolidge.

N. **Stateline Return Flow Subaccount** – a subaccount of the Offset Account for water that will be required to maintain historical Stateline return flows pursuant to Paragraph 4 of the Offset Account resolution.

O. **Stateline Return Flow Transit Loss Subaccount** – a subaccount of the Offset Account for the associated transit loss water

needed to deliver historical Stateline return flows to the Stateline Pursuant to Paragraph 8 of the Offset Account Resolution.

2. Subaccounts currently approved for the Offset Account.

The Offset Account, as provided for by the **Offset Account Resolution (OAR)**, shall consist of the following subaccounts:

A. Colorado Consumable Subaccounts (OAR Paragraphs 3 & 4)

   i. Colorado Upstream Consumable Subaccount

   ii. Colorado Downstream Consumable Subaccount

B. Colorado Upstream (OAR Paragraph 6)

C. Instate Return Flow to Colorado Ditches (OAR Paragraph 4)

   i. Keesee Winter Return Flows

D. Kansas Consumable (OAR Paragraph 5.B.)

E. Kansas Storage Charge (OAR Paragraph 9)

F. Kansas Stateline Return Flow (OAR Paragraph 4 & 5, 5 deals with the evaporation on Stateline Return Flows after Kansas has been noticed)

G. Stateline Return Flow (OAR Paragraph 4)

H. Stateline Return Flow Transit Loss (OAR Paragraph 8)

Additional subaccounts may be approved only by mutual agreement by both States. Notice of a proposed subaccount (including a detailed written description of the need and justification for the subaccount) must be given from one state to the other; and the response is due from the notified State within two weeks upon receipt.

3. Determination of Credits for the Delivery of Water Released from the Offset Account

The States agree to determine credits for the delivery of water released from the Offset Account on Kansas' demand based on measured **Stateline flow** in accordance with the criteria described below.

A. Release accounting and stream flow data used in the evaluation of all deliveries will be as follows:

i. Accounting records of the Operations Secretary for Offset Account releases, including hourly records of gate changes identifying the beginning and end of releases.

ii. Provisional, hourly, and daily satellite data from pertinent gaging stations between John Martin Reservoir and the Stateline. Stateline deliveries for which Colorado will receive credit will be based on the mean daily **Stateline flow**.

iii. The United States Geological Survey (USGS) provides the State of Colorado

with a data feed of shift-corrected discharge values on an hourly basis. The data provided is in a non-aggregated time step, typically 15-minute measurement intervals. Once data is loaded into the Colorado Division of Water Resources database, it is not updated with subsequent data from the USGS. Therefore, data used for water administration remains the same as during the time the water was administered. Colorado will daily extract 15 minute discharge data for the Arkansas River at Granada, the Frontier Ditch, and the Arkansas at Coolidge gages for the previous 24-hour period to update previously transmitted data and export this and previous data for the most recent 7-day period as a delimited text file to an ftp directory accessible by persons designated by the Colorado State Engineer or Kansas Chief Engineer. **Provisional data** shall be used for all the calculations described in this agreement. Colorado will provide and maintain the auto-executable program to periodically update databases maintained in their respective offices with this data to ensure identical stream flow data sets to be used to evaluate deliveries of water from John Martin Reservoir to Kansas.

B. The antecedent flow during the Offset Account delivery will be determined as follows:

i. Use the mean daily **Stateline flow** for the 10 full days preceding the date of delivery arrival, provided that the variability within the period does not depart from the 10-day average by more than 10%. The date of delivery arrival for the purpose of this Paragraph shall be two days after the initiation of the release with the first day of release being day zero. Days of **Stateline flow** which exceed 110% of the initial average will be removed until an average base flow with less than +/- 10% variability is achieved to remove interference caused by precipitation or the effect of Colorado ditch operations during the 10-day period. No more than two iterations of antecedent flow calculation will be performed and no fewer than six days out of the preceding 10-day period will be used in determining the antecedent flow except as provided in the following two paragraphs.

ii. If an Offset Account release follows within 10 days of any other release from a Kansas account (including the Offset Account), the antecedent flow for the current Offset Account release shall be the same as the antecedent flow determined for the previous release using the same procedures as described above in Paragraph 3.B.i.

iii. If the average flow for the 10-day period preceding the 10 days (i.e. days 11 through 20 prior to arrival of the release) used to determine antecedent flow is more than twice the computed antecedent flow computed above in Paragraph 3.B.i., the antecedent flow will be adjusted to be the average of: a) the antecedent flow as described above in Paragraph 3.B.i. and b) the hydrograph flow value using the **Muskingum method** described below in Paragraph 3.C. on the sixth day following the end of the release from John Martin Reservoir with the last day of the release being day zero.

C. For Offset Account releases occurring without consecutive Kansas Section II Account releases, the credit component of the Offset Account release at the Stateline for which Colorado will receive 100% credit as a replacement of depletions to usable Stateline flow will be determined as follows:

i. The mean daily release from the Offset Account will be multiplied by 1.05.

ii. These adjusted mean daily values will be routed to the Stateline using the **Muskingum method** with the following parameters: K = 60 hours, x = 0.15 and t = 24 hours.

iii. The resulting Muskingum hydrograph will be lagged one day, in addition to the

lag included within the Muskingum routing.

iv. The Stateline delivery for the purpose of determining Offset credit will be determined as the lesser of: a) the **Stateline flow** less antecedent flow or b) the lagged Muskingum hydrograph.

v. The Stateline delivery determination will end the sixth day following the end of the release from John Martin Reservoir with the last day of the release being day zero and with the delivery for the sixth day being prorated by the ratio of the number of hours of release in day zero divided by 24.

vi. The Offset Account delivery efficiency will be the Stateline delivery determined in the manner described above divided by the total Offset Account release.

vii. Under no circumstances shall more than 100% of the total volume released from the Offset Account over the entire period of the release be determined to be delivered under these procedures.

viii. The credit for the **Consumable Portion of the Release** will be determined as the Offset Account delivery efficiency multiplied by the **Consumable Portion of the Release**.

D. For combined releases of Offset Account and Kansas Section II Account water, the credit component for the Offset Account release at

the Stateline for which Colorado will receive 100% credit as a replacement of depletions to usable **Stateline flow** and the Equivalent Stateline Flow (ESF) volume for determining transit losses associated with Kansas Section II Account release will be determined as follows:

i. The mean daily release from the sum of the Offset Account and the Kansas Section II Account releases will be multiplied by 1.05.

ii. These adjusted mean daily values will be routed to the Stateline using the **Muskingum method** with the following parameters: K = 60 hours, x = 0.15 and t = 24 hours.

iii. The resulting Muskingum hydrograph will be lagged one day, in addition to the lag included within the Muskingum routing.

iv. The Stateline delivery, for the purpose of determining Offset credit, will be determined as the lesser of: a) the **Stateline flow** less antecedent flow or b) the lagged Muskingum hydrograph.

v. The Stateline delivery determination will end the sixth day following the end of the release from John Martin Reservoir with the last day of the release being day zero and with the delivery for the sixth day being prorated by the ratio

of the number of hours of release in day zero divided by 24.

vi. The Offset Account delivery efficiency will be the Stateline delivery determined in the manner described above divided by the total of Offset Account and Kansas Section II Account releases.

vii. The credit for the **Consumable Portion of the Release** will be determined as the Offset Account delivery efficiency multiplied by the **Consumable Portion of the Release**.

viii. The ESF delivery will be determined as the lesser of: a) the **Stateline flow** or b) the lagged Muskingum hydrograph.

ix. The ESF delivery determination will end the sixth day following the end of the release from John Martin Reservoir with the last day of the release being day zero and with the delivery for the sixth day being prorated by the ratio of the number of hours of release in day zero divided by 24.

x. The ESF percentage will be calculated as the ESF delivery (determined using Sub-paragraphs 3.D.i through 3.D.iii and 3.D.viii through 3.D.ix) divided by the total of the releases from the Offset Account and Kansas Section II Account.

xi. The volume of the Kansas Section II ESF is the total of the Kansas Section II

releases multiplied by the ESF percentage.

xii. If the ESF volume for the Kansas Section II Account delivery is less than the Kansas Section II Account volume released, the resulting transit loss will be replenished to the Kansas Section II Account.

xiii. Under no circumstances shall more than 100% of the total of either the release from the Offset Account or the Kansas Section II Account over the entire period of the release be determined to be delivered for that account under these procedures.

xiv. For the purposes of these determinations, the volume of multiple releases from the same account during the combined releases will be summed and treated as a single value.

4. Credit for evaporation from water stored in the "Kansas Consumable Subaccount" (KCS).

As provided in the **Offset Account Resolution (OAR)**, once Kansas has received a 30-day notice and evaporation is now being assigned to the KCS, Colorado may accumulate the evaporation for later credit as determined below in this Paragraph. Commencing April 1 of each year, the content of the KCS will be subject to the following accounting procedures and shall be used to establish evaporation eligible for credit from the KCS:

A. During the period of April 1 through June 30, if Kansas does not call for water from the KCS, evaporation eligible for credit as a replacement of depletions to usable Stateline flows for water stored in the KCS will begin the day following a **Reasonable Opportunity** for Kansas to call for water. If a **Reasonable Opportunity** has occurred and Kansas has chosen not to call for water from the KCS, evaporation eligible for credit as a replacement of depletions to usable Stateline flows for all water stored in the KCS will continue until either Kansas calls for a release of water and exhausts the KCS, or until the succeeding April 1, whichever comes first. However, if Kansas chooses to call for water from the KCS, evaporation eligible for credit will commence on the date of release and will continue until either the KCS is exhausted, or until the succeeding April 1, whichever comes first.

B. During the period of April 1 through June 30, if Kansas does not call for water from the KCS and there is no **Reasonable Opportunity** for Kansas to call for water, the evaporation eligible for credit as a replacement of depletions to usable Stateline flows for all water stored in the KCS will begin on July 1 and will continue until either Kansas calls for a release of water and exhausts the KCS, or until the succeeding April 1, whichever comes first.

C. During the period of April 1 through June 30, if Kansas does call for water from the

KCS, evaporation eligible for credit from additional water delivered to and stored in the KCS that is less than 3,500 acre-feet will be deferred until July 1 but will then continue until either Kansas calls for a release of water and exhausts the KCS, or until the succeeding April 1, whichever comes first.

D. During the period of April 1 through June 30, if Kansas does call for water from the KCS, evaporation eligible for credit from additional water delivered to and stored in the KCS that is equal to or greater than 3,500 acre-feet will begin on the date the 3,500 acre-feet for the total volume was achieved and will continue until either Kansas calls for a release of water and exhausts the KCS, or until the succeeding April 1, whichever comes first.

E. During the period of July 1 through September 30 evaporation eligible for credit for additional water delivered to and stored in the KCS from July 1 through September 30 will begin on the day water is delivered and stored in the KCS and will continue until either Kansas calls for a release of water and exhausts the KCS, or until the succeeding April 1, whichever comes first.

F. Colorado shall receive no credit as a replacement of depletions to usable Stateline flows for evaporation from additional water delivered to and stored in the KCS during the period October 1 through March 31.

G. Commencing April 1 of each succeeding year, the accounting and procedures as described in this Paragraph 4 shall be used to establish initial conditions for assigning evaporation eligible for credits from the KCS for that year.

H. The evaporation credit component for offsetting usable depletions to Stateline flows will be computed by applying the Offset Account delivery efficiency for the next Offset Account release, as set forth in Paragraph 3 above, to the quantity of KCS evaporation eligible for credit. Colorado will not seek credit for the computed transit loss component of this water. Kansas Storage Charge water and the Kansas Stateline Return Flow water shall not be placed into the KCS, nor shall evaporation from these subaccounts be eligible for credit.

5. Assignment of Transit Losses

The **Consumable Portion of the Release** from the Offset Account that is not credited as a delivery at the Stateline, as determined in Paragraph 3 above, will be considered to be transit loss and a portion of that amount, as determined below, will be input into the **H-I Model** as a special water and assigned to reaches between John Martin Reservoir and the Stateline. The transit loss to the three reaches between stream gages below John Martin Reservoir (JMR to Lamar, Lamar to Granada, Granada to Stateline) will be determined in proportion to the percentages of transit loss determined using the Livingston Reach 6 factors

with the antecedent flows at the stream gages at JMR, Lamar and Granada. However, if through the cooperative efforts of the States, an improved method of determining transit losses between John Martin Reservoir and the Stateline is devised, that method may be utilized through amendment of this agreement pursuant to Paragraph 11. In determining the portion of the transit loss that will be included in the **H-I Model**, the flows through the Granada gage will be used to assess Colorado's efforts to administer the released water past Colorado ditch headgates. The procedure to determine the amount of transit loss to be input into the **H-I Model** as a special water will be as follows:

A. Upon a call for an Offset Account release from John Martin Reservoir, the flows will be evaluated for the prior ten-day period in a manner consistent with Sub-paragraph 3.B above for the Arkansas River below John Martin Reservoir, the Arkansas River at Lamar and the Arkansas River near Granada river gages to compute a target flow rate at the Granada gage computed as the Granada antecedent flow plus the Offset Account release rate less the transit loss based on Livingston Reach 6 factors. During the Offset Account release, Colorado will administer the release to attempt to maintain the target flow rate at the Granada gage. Changes in the Offset Account release rate will cause a change in the Granada gage target rate (based on the original calculation using the Livingston Reach 6 factors), computed

by the new release rate multiplied by the original transit loss percentage plus the antecedent flow.

B. At the conclusion of the release, the actual volume delivered through the Granada gage will be determined using mean daily flows from the **Provisional Data** for the Granada gage for the target evaluation period, which is from the date of the first day of release arrival at the Stateline through the day following the last full day of release at John Martin Reservoir. This value will be compared to the volume calculated using the delivery target flow rate at Granada multiplied by the number of days between release arrival at the Stateline and one day following the last full day of release at John Martin Reservoir. If the volume of actual delivery through the Granada gage for this period is greater than or equal to the target volume delivery, 75% of the transit losses determined for the delivery will be input into the **H-I Model** as special water. See Table A below for a sample computation.

C. If the volume of actual delivery through the Granada gage for the target evaluation period is less than the target volume delivery, the amount of the transit loss in the JMR to Lamar reach that is eligible for use as a transit loss input for the **H-I Model** is reduced by the ratio of the target transit loss in that reach derived using the Livingston Reach 6 factors to the actual transit loss in that reach calculated from the difference

between the target flow rate at Granada and the actual delivery flow rate at Granada. The portion of the total delivery transit loss attributed to that reach is multiplied by this ratio to obtain the amount of the transit loss in the JMR to Lamar reach that is eligible for use as a transit loss input. The same computation is performed to determine the amount of the transit loss in the Lamar to Granada reach that is eligible for use as a transit loss input for the **H-I Model**. The transit loss eligible for input into the **H-I Model** in the Granada to Stateline reach is unchanged. Seventy-five percent of the transit loss determined for each of the three reaches will be input into the **H-I Model** as a special water. See Table A below for a sample computation for this case.

Table A: Sample computation for assignments of Transit Loss

Delivery Target Met							
	JMR	JMR to Lamar Reach	Lamar	Lamar to Granada Reach	Granada (Delivery Target)	Granada to Stateline Reach	Stateline
Flow Rates	250 cfs		237.5 cfs		225 cfs		200 cfs
Transit Losses		12.5 cfs		12.5 cfs		25 cfs	
% of total TL		25%		25%		50%	
CU Delivery Transit Loss							1000 ac-ft
Transit Loss by Reach		250 ac-ft		250 ac-ft		500 ac-ft	
75% of TL input as Special Water		187.5 ac-ft		187.5 ac-ft		375 ac-ft	750 ac-ft
Delivery Target Not Met							
	JMR	JMR to Lamar Reach	Lamar	Lamar to Granada Reach	Granada (Delivery Target)	Granada to Stateline Reach	Stateline
Flow Rates	250 cfs		237.5 cfs		225 cfs		200 cfs
Transit Losses		12.5 cfs		12.5 cfs		25 cfs	
% of total TL		25%		25%		50%	
CU Delivery Transit Loss							1000 ac-ft
Transit Loss by Reach		250 ac-ft		250 ac-ft		500 ac-ft	
Actual Delivery Rate					200 cfs		
Actual Transit Loss		25 cfs		25 cfs			
Adjusted Transit Loss		125 ac-ft		125 ac-ft		500 ac-ft	750 ac-ft
75% of Adjusted TL input as Special Water		93.75 ac-ft		93.75 ac-ft		375 ac-ft	562.5 ac-ft

6. Disposition of return flow water from Keesee Ditch, XY-Graham Canal, and Stubbs Ditch Section II accounts that is transferred into the Offset Account.

The procedure used to determine the timing and quantity of return flows is described herein. When Colorado transfers water from one of the subject Section II accounts to the Offset Account under the provisions of paragraph 4 of the **Offset Account Resolution**, the water transferred from the Section II account will be split into its consumptive use, in-state return flow and Stateline return flow components as described in Attachment A.

In-state return flows and the associated transit loss will be simulated in the **H-I Model** as a special water input, either as an input to the river in Reach 11 if return flows are actually released to the river, or as an input to individual Section II accounts of Colorado ditches, as actually occurs.

The consumptive use water, Stateline return flows and the associated transit loss and evaporation that is transferred to the Offset Account will be disposed of in accordance with the provisions of paragraphs 4, 5, and 8 of the **Offset Account Resolution**. The Stateline return flow will be simulated in the **H-I Model** as follows: (1) For return flows that remain in the Offset Account at the direction of the Kansas Chief Engineer, Stateline return flows will be simulated in the **H-I Model** by adding a special water equal to the return flow according to the schedules in Attachment

A. Seventy-five percent of the transit loss water will be added to Reach 11. (2) For water transferred into the Kansas Section II account at the direction of the Kansas Chief Engineer, a special water input equal to the amount of the transfer will be made. (3) For Stateline return flows delivered to the river, a special water input equal to the amount of the release will be made to Reach 11, unless this water is delivered past the headgates of canals in Colorado, in which case it will be added to the reach to which it was delivered. In either case, seventy-five percent of the transit loss release will be input to Reach 11. Nothing in this subsection relating to the distribution of Stateline return flow or simulation of Stateline return flow in the **H-I Model** will affect the assignment of evaporation charges as set out in the **Offset Account Resolution**, paragraph 5.B.

7. Using H-I Model 10-year compliance results to determine additional amounts of water for delivery to the Offset Account by Colorado and to reset the status of Colorado's monthly accounting for the purpose of evaporation accounting under the provisions of the Offset Account Resolution.

To use the **H-I Model** to determine Compact compliance in accordance with the Special Master's recommendations in the Fourth Report, two steps are required. The first step is to run the **H-I Model** in both the historic and Compact modes to determine the accretions or depletions to usable Stateline flows for the previous 10-year period resulting from post-Compact

well pumping and replacement sources represented in the **H-I Model**. The second step is to sum Colorado's Stateline delivery credits for fully consumable water delivered from the Offset Account to the Stateline for the previous 10-year period including any credits for evaporation from water stored in the KCS that Colorado is entitled to. The resulting quantities from these two steps are then used to calculate the final determination of accretions or depletions to usable Stateline flows for the previous 10-year period. This final quantity is shown as Accretion A or Depletion A in Table B below.

In the monthly accounting performed by Colorado to replace well pumping depletions using the methods used to implement the Amended Use Rules, the credits that Colorado is entitled to as a result of deliveries from the **Colorado Consumable Subaccounts** to the Stateline are used to balance stream depletions that are calculated each month until these delivery credits are exhausted. These credits are shown as Accretion B in Table B below.

Analysis of the **H-I Model** runs used to determine Accretion A or Depletion A should be completed by mid-March of the year following the 10-calendar year period for which Compact compliance is being determined. Prior to the first full 10-year period, this accounting will be performed using years 1997 through 2005. When this analysis is completed, the actions summarized in the table below should be taken to reset the credit/depletion status of Colorado's monthly accounting.

Table B: Actions to reset the credit/depletion status of Colorado's monthly accounting

Results of the **H-I Model** analysis for the most current 10 year compliance period	Monthly Accounting Status at the end of December of the last year of the 10 year compliance period	Reset Action for Accretion B (Monthly Accounting Status for the beginning of the current calendar year)
IF	**AND IF**	**THEN**
Accretion A	Accretion B > 0 (Credits are used in monthly accounting before any further water is transferred to the KCS)	Reset to Accretion A (Credits are used in monthly accounting before any further water is transferred to the KCS)
Accretion A	Accretion B = 0 (Water is transferred to the KCS after monthly accounting)	Reset to Accretion A (Move KCS back to Colorado CU sub account for Jan-Mar of current year. Credits are used in monthly accounting before any further water is transferred to the KCS)
Depletion A	Accretion B = 0 (Water is transferred to the KCS after monthly accounting)	Place CU water = Depletion A into the Offset Account (Water is transferred to the KCS after monthly accounting)
Depletion A	Accretion B > 0 (Credits are used in monthly accounting before any further water is transferred to the KCS)	Reset Accretion B = 0 Place CU water = Depletion A into the Offset Account (Water is transferred to the KCS after monthly accounting)

8. New accounting procedures or calculations developed through collaborative efforts, including improved methodology to determine transit losses between John Martin Reservoir and the Colorado-Kansas Stateline, may be implemented or substituted with existing procedures or calculations upon modification of this agreement pursuant to Paragraph 11.

9. Colorado will employ best water administrative practices and enforcement activities to assure the timely delivery of Offset Account releases from John Martin Reservoir to the Colorado-Kansas Stateline in order to maximize delivery of such water to the Stateline.

10. If Kansas calls for more than 10,000 AF from the **Colorado Consumable** and/or **Kansas Consumable Subaccounts** during the period of November 1 to March 31 in any consecutive three years period, the transit losses on that part of the releases exceeding 10,000 AF, will be input into the **H-I Model** as special waters in the following April using the procedures provided for in Paragraph 5.

11. The States may agree to modify this Agreement, or any portion thereof, provided any amendment is not inconsistent with the Compact and the decisions of the Court in this case. Either State may seek modification of this Agreement by giving notice to the other State's Chief or State Engineer in writing. The States will cooperate in a good-faith effort to resolve issues raised by the proposed modification. The States may modify this Agreement only by mutual agreement or, if the

States are unable to agree on a proposed modification to this Agreement, a State may submit the matter to the dispute resolution process included in the final decree in this case, including binding arbitration.

The States also agree to review this Agreement and the **Offset Account Resolution** every five years to determine whether the provisions can be improved in the interest of continuing interstate comity and effective water management. The first review shall occur five years from the effective date of this Agreement.

OPERATIONAL GUIDELINES

Although not mandatory, to enhance the efficient and timely delivery of water released from the Offset Account, the States also agree to the following guidelines:

1. Kansas should avoid calling for releases from the Offset Account during the period November 1 through March 31. Exceptions may be made whenever stream conditions are favorable for a release and the water is needed in Kansas, or when a spill is expected.

2. When antecedent flow is 100 cfs, or less, Kansas will call for releases from the Offset Account at a flow rate of at least 250 cfs and for a minimum of 7 days, although Kansas may reduce or terminate a release from the Offset Account if a precipitation event diminishes the demand for water in Kansas.

Further, Kansas may request a release from the Offset Account of shorter duration than 7 days if it is made in conjunction with a consecutive release from the Kansas Section II Account.

3. Unless Kansas specifies otherwise, releases from Offset subaccounts will be made in the following order:

   A. Kansas Consumable Subaccount
   B. Kansas Storage Charge Subaccount
   C. Kansas Stateline Return Flows Subaccount
   D. Colorado Consumable Subaccount
   E. Stateline Return Flow Subaccount and Stateline Return Flow Transit Loss Subaccount

4. Kansas will use its best efforts to maximize the efficiency of Offset Account deliveries, including but not limited to, the release of Kansas Storage Charge water in conjunction with water released from other subaccounts.

JOINTLY APPROVED: 9-30-2005

/s/ Hal D. Simpson
Hal D. Simpson
Colorado State Engineer

/s/ David L. Pope
David L. Pope
Kansas Chief Engineer

/s/ David W. Robbins
David W. Robbins
Special Assistant to the
Colorado Attorney General

/s/ John B. Draper
John B. Draper
Special Assistant to the
Kansas Attorney General

ATTACHMENT A TO APPENDIX F.2

Timing of Stateline Return Flows

In determining the monthly timing of the releases needed to generate equivalent Stateline Return Flows resulting from the transfer of Section II water from the Keesee, XY-Graham and Sisson Stubbs Accounts into the Offset Account, a percentage of the return flow that would occur for each calendar month is used which is independent of when the delivery of Section II water is made to the Offset Account. The monthly return flow percentages are determined using a delivery schedule to all ditches based on the record of actual deliveries and the determination of the demand for Section II water for each month during the irrigation season. The following three tables provide the Stateline Return Flow schedules for each of the three Section II accounts.

Keesee Average Monthly Response (%)

Month	Reach 11	Reach 12	Reach 13
Jan	0.7277	14.4701	2.4729
Feb	0.6397	10.5869	1.7301
Mar	0.5441	7.7693	1.2423
Apr			
May			
Jun			
Jul			
Aug			
Sep			
Oct			
Nov	0.7747	28.5648	6.0282
Dec	0.7944	19.9629	3.6920
Total	3.4805	81.3541	15.1654

XY-Graham Average Monthly Response (%)

Month	Reach 15	Reach 16	Reach 17	Reach 18
Jan	0.1621	1.3203	2.9592	0.1707
Feb	0.1533	1.1543	2.5478	0.1505
Mar	0.1453	1.0292	2.2195	0.1328
Apr	0.1301	2.6078	5.3561	0.1086
May	0.1335	3.6277	7.0891	0.1134
Jun	0.1569	4.1302	8.1189	0.1518
Jul	0.1723	4.4509	8.8509	0.1843
Aug	0.1881	3.8384	7.7097	0.2163
Sep	0.1953	3.0393	6.3288	0.2333
Oct	0.1877	2.6140	5.5987	0.2246
Nov	0.1809	1.9738	4.3039	0.2114
Dec	0.1733	1.5592	3.5015	0.1941
Total	1.9788	31.3452	64.5842	2.0918

Stubbs Average Monthly Response (%)

Month	Reach 17	Reach 18	Reach 21
Jan	0.2386	2.2571	0.0162
Feb	0.1911	1.7464	0.0179
Mar	0.1536	1.3881	0.0192
Apr	0.0795	8.3885	0.0191
May	0.062	13.248	0.0185
Jun	0.1473	15.2972	0.0172
Jul	0.2303	16.3472	0.0153
Aug	0.3187	13.3833	0.0137
Sep	0.3786	9.5142	0.0125
Oct	0.3657	7.507	0.0122
Nov	0.3339	4.832	0.013
Dec	0.2943	3.1081	0.0143
Total	2.7936	97.0171	0.1891

Quantities of Return Flows, Stateline and In-state

To obtain the quantities of water that would be used as special water inputs to the H-I Model for Stateline Return Flows or In-state Return Flows, the following procedure would be used. The table below shows the allocation into various types of water of the water transferred from the subject Section II accounts. The Stateline return flow would be placed in the Stateline Return Flow Subaccount and transferred to the Kansas Stateline Return Flow Subaccount or released to the river using the schedules determined above with the Stateline return flow quantity in the table below. The transit loss associated with the Stateline return flow would be placed in the Stateline Return Flow Transit Loss Subaccount. Finally, the consumptive use water would be placed in the Colorado Consumable Subaccount.

Breakdown of Transferred Section II Water (%)

Water Type	Keesee	XY-Graham	Stubbs
To Ft. Bent	3.0		
To Amity	14.7		
To Lamar	8.3		
To Buffalo		1.4	
To Stateline	9.7	37.7	35.9
Trans Loss	0.5	3.2	5.0
Rtn Flow	9.2	34.5	30.9
CU Water	64.3	60.9	64.1
Total	100	100	100

APPENDIX G

ACCEPTABLE SOURCES OF WATER

APPENDIX G.1

General Principles

Acceptable Sources of Water shall be limited to: 1) precompact sources, 2) postcompact sources, 3) transmountain water, and 4) water in Colorado Section II Accounts, as these sources are defined below. Acceptable Sources of Water to make up a Shortfall shall not include transmountain water, however.

1. *Precompact Sources* – Precompact sources, including nontributary groundwater,[1] are sources that were actually in use prior to December 14, 1948. Precompact sources shall be acceptable to the extent that they are included in the H-I Model, or, if not included in the H-I Model, to the extent that Colorado can demonstrate that they were actually used prior to December 14, 1948. For nontributary groundwater, Colorado shall have the burden to demonstrate that the use of such source does not deplete usable Stateline flow, except as provided in paragraph 5 below.

2. *Postcompact Sources* – Postcompact sources, including nontributary groundwater, are sources that were actually used in Colorado only on or after December 14, 1948, regardless of priority

[1] For the current definition of nontributary groundwater, see Colo. Rev. Stat. § 37-90-103(10.5) (2006).

under Colorado law. Colorado shall have the burden to demonstrate that the use of such sources does not deplete usable Stateline flow, except as provided in paragraph 5 below.

3. *Transmountain Water* – Transmountain water is water brought into the Arkansas River Basin from other river basins, including return flows of such water. Transmountain water deliveries to the H-I Model Domain shall be an input to the H-I Model in the Historical run to the extent that Colorado can demonstrate that such deliveries were made.

4. *Water in Colorado Section II Accounts* – Water in Colorado Section II Accounts is water stored in the accounts of the Colorado Water District 67 ditches established in Section II of the ARCA Resolution Concerning an Operating Plan for John Martin Reservoir (contained in Appendix L of this Decree). Water in Colorado Section II Accounts may be used for Replacement to the extent that Colorado can demonstrate that historical return flows (i.e., return flows that would have occurred if the water in the Colorado Section II Accounts had been used for the purposes for which it was used prior to the change to Replacement purposes) will be maintained and that usable Stateline flow will not be depleted by such use. The procedure used to determine the timing and quantity of return flows from water in the Keesee Ditch, X-Y Graham, and Stubbs Ditch Section II accounts that is transferred into the Offset Account is described in paragraph 6 of the Offset Account Crediting Agreement (Appendix F.2 of this Decree).

5. *Dakota and/or Cheyenne Groundwater* – Replacement credit shall not be allowed for any source of water available from the Dakota and/or Cheyenne aquifers except as provided in Appendix G.2 of this Decree.

6. *Determination of Replacement Credits Not Determined by the H-I Model* – Replacement credit for Acceptable Sources of Water not determined by using the H-I Model, and that has been determined by the Colorado Water Court, shall be the amount determined by the Colorado Water Court, subject to the right of Kansas to seek relief under the Court's retained jurisdiction pursuant to the Dispute Resolution Procedure. Replacement credit for Acceptable Sources of Water not determined by the Colorado Water Court shall be determined according to sound, appropriate, and reliable engineering principles and commonly accepted engineering practices. Replacement credit for precompact sources shall not include credit resulting from the improved or prolonged functioning of works existing at the time of the Compact that depletes usable Stateline flow in violation of Article IV-D of the Compact, but shall include the benefits of John Martin Reservoir pursuant to the Compact. Colorado shall have the burden to demonstrate that any improved or prolonged functioning of existing works that took place in the postcompact period does not deplete usable Stateline flow. Exclusion of credit resulting from improved or prolonged functioning of existing works in the postcompact period that does deplete usable Stateline flow shall be ensured by imposing all necessary terms

and conditions, which may include, but are not limited to, the following:

(1) A limit on the period of use, including a limitation to the irrigation season;

(2) Monthly, annual, and long-term volumetric limits, or their equivalent;

(3) Physical availability determinations; and

(4) Legal availability determinations (amount in priority, etc.)

Replacement credit for transmountain water shall not be limited to historical consumptive use. Replacement credit for water in Colorado Section II Accounts shall be determined in accordance with Appendix F.2 of this Decree to the extent Appendix F.2 is applicable.

APPENDIX G.2

Agreement

Memorandum

To: David Pope, Chief Engineer, Kansas Division of Water Resources

From: Hal Simpson, State Engineer, Colorado Division of Water Resources

Date: September 23, 2005

Subject: Condition of approval for replacement plans using water withdrawn from the Dakota and/or Cheyenne aquifers

In our meeting on September 1, 2005, you expressed a concern regarding the use of water produced from the Dakota and/or Cheyenne aquifers as a replacement source in plans approved pursuant to the Amended Rules and Regulations Governing Diversions and Use of Tributary Ground Water in the Arkansas River Basin, Colorado. We agreed that this concern will be resolved if appropriate conditions of approval are included in plans approved by my office. Therefore, I have developed the following condition to be included in letters approving such replacement plans, where appropriate:

Replacement credit shall not be allowed for any source of water available from the Dakota and/or Cheyenne aquifers unless pursuant to a decree authorizing the use of said water for augmentation purposes. Furthermore, special water inputs to the Hydrologic-Institutional (HI) model will be limited to

replacement sources for those wells represented in the HI model.

Approved:

/s/ Hal D. Simpson
Hal D. Simpson,
Colorado State Engineer

/s/ David L. Pope
David L. Pope,
Kansas Chief Engineer

APPENDIX H

DISPUTE RESOLUTION PROCEDURE

APPENDIX H

Dispute Resolution Procedure

I. Definitions

Whenever used in this Appendix, the following terms shall mean:

Day: A calendar day. If the end of the designated time period, or a day specified in the applicable schedule to be used to arbitrate issues, falls on a Saturday, Sunday, or legal holiday, then the described action will be due on the next day that is not a Saturday, Sunday, or a legal holiday specified by name in Rule 6(a) the Federal Rules of Civil Procedure, and any other day appointed as a holiday by the President or Congress of the United States and all official state holidays of Kansas and Colorado.

Engineers: The Colorado State Engineer, Colorado Division of Water Resources, Colorado Department of Natural Resources; and the Kansas Chief Engineer, Division of Water Resources, Kansas Department of Agriculture; or comparable officials succeeding to their duties and functions.

Fast Track Issue: Any Non-Substantive Change, as defined in Section V.A. of Appendix B.1 of this Judgment and Decree ("Decree"), to the H-I Model; the annual determination of Compact compliance and repayment accounting as described in Appendix A.1 of this Decree; and any other issue that the States agree to designate as a Fast Track Issue.

Federal Representative: The representative designated by the President of the United States pursuant to Article VIII.C of the Compact who acts as chairman of the ARCA.

Meeting: A conference in person, by telephone, or by other means authorized by the States.

Non-Fast Track Issue: Any issue that is not a Fast Track Issue.

Submitted to the ARCA: An issue is deemed to have been Submitted to the ARCA when a written statement requesting action or decision by the ARCA has been delivered to all members of ARCA, including the Federal Representative, by a widely accepted means of communication.

See Section V of this Decree for definitions of additional terms used in this Appendix.

II. Fast Track Issue Resolution Procedure

If a Fast Track Issue has not been resolved informally, the following steps shall be followed, unless the States agree otherwise, if a State desires to resolve the issue:

1. The State raising the issue(s) shall give notice in writing to the other State describing the issue(s), designating the issue(s) as a Fast Track Issue, and designating the expert(s) from that State to participate in the discussions described below.

2. Within 10 days of receiving the notice described in paragraph (1), the other Engineer shall designate the expert(s) from that State to participate in the discussions. The States shall then schedule and conduct meetings of appropriate experts from each State designated by the Engineers within 30 days to attempt to resolve the issue(s). Both States shall cooperate in good faith to schedule the meetings.

3. Within 10 days of the conclusion of the 30 days for expert discussion, if the issue(s) has not been resolved, the experts shall prepare a joint written report and submit it to the Engineers. The report shall set forth the areas of agreement and disagreement among the experts. If the experts cannot agree on a joint report, each State's expert(s) shall simultaneously submit a separate report to the Engineers.

4. If the issue(s) has not been resolved, the Engineers shall hold a meeting to discuss the issue(s) within 30 days of receiving the report(s) from the experts.

5. If the Engineers do not resolve the issue(s) within 30 days of receiving the report(s), the issue may be Submitted to the ARCA within 10 days by the State raising the issue(s) if it still wants to have the issue(s) resolved. Any issue(s) Submitted to the ARCA by a State shall include a specific description of the issue(s) and supporting materials, including the written report(s) of the experts.

6. If the ARCA does not resolve the issue(s) within 30 days of its being Submitted to the ARCA, either State may submit the issue(s) to Fast Track arbitration. Arbitration shall be initiated by providing written notice to the other State and the Federal Representative. The notice shall include a brief, clear written description of the issue(s) to be arbitrated. Arbitration shall be conducted in accordance with the Rules of Arbitration set forth in Section II of this Appendix. If both States agree, the issue(s) may be submitted to Non-Fast Track arbitration.

7. The following schedule shall be used to arbitrate Fast Track Issues:

   Day 1 — The State raising the issue(s) to be arbitrated provides the notice set forth in Section II.6 above.

   Day 7 — The States mutually agree on one arbitrator for each issue.

   Day 10 — If they do not agree, each State will select one arbitrator.

   Day 20 — The two arbitrators selected by the States shall select a third arbitrator.

   Day 24 — If the two arbitrators fail to select a third arbitrator, the States shall each propose a candidate for the third arbitrator to the Federal Representative, who shall select the third arbitrator from the candidates proposed by the States or

choose any other qualified arbitrator.

Day 24 The States shall exchange final witness lists, testimony summaries and exhibits.

Day 27 Pre-hearing conference.

Day 40 The States shall exchange responsive witness lists, testimony summaries, and exhibits.

Day 47 Discovery complete.

Day 53 Arbitration hearings begin.

Day 60 Arbitration hearings complete.

Day 75 Final decision(s) by arbitrator(s).

III. Non-Fast Track Issue Resolution Procedure

If a Non-Fast Track Issue has not been resolved informally, the following steps shall be followed, unless the States agree otherwise, if a State desires to resolve the issue(s):

1. The State raising the issue(s) to be arbitrated shall give notice in writing to the other State describing the issue(s), designating it as a Non-Fast Track Issue, and designating the expert(s) from that State to participate in the discussions described below.

2. Within 10 days of receiving the notice described in paragraph (1), the other Engineer shall designate the expert(s) from that State to participate in the discussions. The States shall then schedule and conduct at least three meetings of appropriate experts from each State designated by the Engineers within 60 days to attempt to resolve the issue(s). Both States shall cooperate in good faith to schedule the meetings.

3. Within 20 days of the conclusion of the 60 days for expert discussion, if the issue(s) has not been resolved, the experts shall prepare a joint written report and submit it to the Engineers. The report shall set forth the areas of agreement and disagreement among the experts. If the experts cannot agree on a joint report, each State's expert(s) shall simultaneously submit a separate report to the Engineers.

4. If the issue(s) has not been resolved, then the Engineers shall hold a meeting to discuss the issues within 60 days of receiving the report(s) from the experts.

5. If the Engineers do not resolve the issue(s) within 60 days of receiving the report(s) from the experts, the issue may be Submitted to the ARCA within 10 days by the State raising the issue(s) if it still wants to have the issue(s) resolved. Any issue(s) Submitted to the ARCA by a State shall include a specific definition of the issue(s) and supporting

materials, including the written report(s) of the experts.

6. If the ARCA does not resolve the issue(s) within 30 days of its being Submitted to the ARCA, either State may submit the issue(s) to Non-Fast Track Arbitration. Arbitration shall be initiated by providing written notice to the other State and the Federal Representative. The notice shall include a brief, clear written description of the issue(s) to be arbitrated. Arbitration shall be conducted in accordance with the Rules of Arbitration set forth in Section VII of this Appendix.

7. The following schedule shall be used to arbitrate Non-Fast Track Issues:

Day 1	The State raising issue(s) to be arbitrated provides the notice set forth in Section III.6 above.
Day 10	The States mutually agree on one arbitrator for each issue.
Day 16	If they do not agree, each State will select one arbitrator.
Day 23	The two arbitrators selected by the States shall select a third arbitrator.
Day 30	If the two arbitrators fail to select a third arbitrator, the States shall each propose a candidate for the third arbitrator to the Federal Representative, who shall select the third arbitrator from the candidates

	proposed by the States or choose any other qualified arbitrator.
Day 48	The States shall exchange final witness lists, testimony summaries and exhibits.
Day 54	Pre-hearing conference.
Day 80	The States shall exchange responsive witness lists, testimony summaries, and exhibits.
Day 94	Discovery complete.
Day 106	Arbitration hearings begin.
Day 120	Arbitration hearings complete.
Day 150	Final decisions by arbitrator(s).

IV. Issues Subject to Binding Arbitration

The States agree that if a State desires to submit any of the following issues to arbitration prior to December 31, 2016, it shall be submitted to binding arbitration: (1) all Fast Track Issues except changes to the H-I Model code to represent new Replacement sources; (2) any proposal to modify reference crop values or crop coefficients for the ASCE standardized Penman-Monteith method for determining PET on the basis of data from new lysimeters to be installed at Rocky Ford; and (3) recalibration of the H-I Model based on new weather station data. The States may agree to extend the term of this section or the issues to be submitted to binding arbitration.

V. Issues Subject to Non-Binding Arbitration

All issues other than those identified in Section IV shall be submitted to non-binding arbitration unless the States agree in writing to submit the issue(s) to binding arbitration.

VI. Notice

Notice or communications required or allowed by this Appendix H shall be made in writing to and from the following:

For Kansas: the Kansas Chief Engineer, with a copy to the Kansas Attorney General or his or her designee.

For Colorado: the Colorado State Engineer, with a copy to the Colorado Attorney General, or his or her designee.

VII. Rules of Arbitration

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RULES OF ARBITRATION

R-1. Agreement of the States

(a) The States of Kansas and Colorado hereby agree to use these Rules of Arbitration for arbitration of Fast Track and Non-Fast Track Issues in accordance with the Dispute Resolution Procedures in this Appendix. The States, by written agreement, may vary the procedures set forth in these Rules. After appointment of the arbitrator(s), such modifications shall also require the consent of the arbitrator(s).

R-7. Jurisdiction

The arbitrator(s) shall have the power to rule on any issues relating to the interpretation of these Rules or the scope of the arbitration.

R-10. Location of Hearing

For each issue to be arbitrated, the States shall agree, if possible, on a location where the arbitration is to be held. If the States cannot agree on a location in accordance with the schedule set forth in Section II.7 or III.7, as applicable, the arbitrator(s) shall set the hearing at a neutral location in the continental United States (a location where no counsel or witnesses live or work).

R-11. Appointment of Arbitrator(s)

An arbitrator must have appropriate qualifications for the issue(s) to be decided by that arbitrator. If an arbitrator does not have the technical expertise necessary to adequately decide an issue, the arbitrator may employ an expert with such expertise. This expert shall also be of demonstrable impartiality and independence. An arbitrator may employ an attorney to assist in conducting the arbitration. The States should agree on whether the hiring of an expert or an attorney to assist the arbitrator(s) is necessary at the time the arbitrator(s) is selected. The States will attempt to hire a single arbitrator who can decide as many issues as possible, but in any event, will select an arbitrator(s) for each issue.

If the States have not agreed on the selection of one arbitrator for each issue in accordance with the schedule set forth in Section II.7 or III.7, as applicable, the arbitrator panel shall be appointed in the following manner: Each State shall select one arbitrator in accordance with the schedule set forth in Section II.7 or III.7, as applicable. Those two arbitrators shall select a third arbitrator in accordance with the schedule set forth in Section II.7 or III.7, as applicable. If the two arbitrators do not agree on a third arbitrator in accordance with the schedule set forth in Section II.7 or III.7., as applicable, the Federal Representative shall select the third arbitrator.

R-16. Disclosure

(a) Any person appointed or to be appointed as an arbitrator shall disclose to the States any circumstance likely to give rise to justifiable doubt as to the arbitrator's impartiality or independence, including any bias or any financial or personal interest in the result of the arbitration or any past or present relationship with the States or their representatives. Such obligation shall remain in effect throughout the arbitration.

(b) In order to encourage disclosure by arbitrators, disclosure of information pursuant to this Section R-16 is not to be construed as an indication that the arbitrator considers that the disclosed circumstance is likely to affect impartiality or independence.

R-17. Disqualification of Arbitrator

(a) Any arbitrator shall be impartial and independent and shall perform his or her duties with diligence and in good faith, and shall be subject to disqualification for:

(i) partiality or lack of independence,

(ii) inability or refusal to perform his or her duties with diligence and in good faith, and

(iii) any grounds for disqualification provided by applicable law.

(b) If there are grounds disclosed or alleged which could disqualify an arbitrator, the States, after reviewing any possible objections to their qualifications or fitness, may mutually agree in writing to allow them to be appointed or to continue as an arbitrator.

(c) Upon objection of a State to the continued service of an arbitrator, the Chairman of ARCA shall determine whether the arbitrator should be disqualified under the grounds set out above, and shall inform the States of his decision, which decision shall be conclusive.

R-18. Communication with Arbitrator

No State and no one acting on behalf of any State shall communicate *ex parte* with an arbitrator or a candidate for arbitrator concerning the arbitration.

R-19. Vacancies

(a) If for any reason an arbitrator is unable to perform the duties of the office, the vacancy shall be filled in the same manner as the original arbitrator was selected in accordance with these rules.

(b) In the event of the appointment of a substitute arbitrator, the substitute arbitrator or the panel of arbitrators shall determine in its sole discretion whether it is necessary to repeat all or part of any prior hearings.

L-3. Pre-hearing Conference

A pre-hearing conference shall be held among the States and/or their attorneys or other representatives and the arbitrator(s) in accordance with the schedule set forth in Section II.7 or III.7, as applicable. Unless the States agree otherwise, the pre-hearing conference will be conducted by telephone conference call rather than in person. At the pre-hearing conference the matters to be considered shall include:

(a) identification of the factual and legal issues to be arbitrated;

(b) exchange of preliminary witness lists;

(c) the extent to which discovery shall be conducted;

(d) whether, and the extent to which, any sworn statements and/or depositions may be introduced;

(e) a determination as to which State will proceed first on each issue;

(f) location of hearing;

(g) the pre-hearing and hearing schedule; and

(h) other matters necessary to resolve these issue(s) to be arbitrated.

The arbitrator(s) shall issue a Scheduling and Procedure Order setting forth the results of the pre-hearing conference.

L-4. Management of Proceedings

(a) Arbitrator(s) shall take such steps as they may deem necessary or desirable to avoid delay and to achieve a just, speedy and cost-effective resolution of the issues.

(b) States shall cooperate in the exchange of documents, exhibits and information within such State's control if the arbitrator(s) consider such production to be consistent with the goal of achieving a just, speedy and cost-effective resolution of the issues.

(c) The States may conduct such discovery as set forth below; however, the arbitrator(s) may place limitations consistent with these rules on the conduct of such discovery as the arbitrator(s) shall deem appropriate. If the States cannot agree on production of documents and other information, the arbitrator(s), consistent with the expedited nature of arbitration, may establish the extent of the discovery.

(d) In accordance with the schedule set forth in Section II.7 or III.7, as applicable, the States shall exchange final lists of proposed witnesses. Each State shall be limited to three witnesses on each issue; however, for good cause shown, the arbitrator(s) may allow additional witnesses. The States shall also exchange at the same time: (1) a detailed description of the issues to be resolved by arbitration; (2) a statement of agreed-upon facts related to each issue and a statement of facts in dispute, (3) a summary of the testimony of each witness, and all proposed exhibits, including a written report, prepared and signed by any person who may present expert testimony setting forth a complete statement of all opinions to be expressed and the basis and reasons therefor, and (4) the backup for the exhibits.

(e) A State may provide responsive exhibits, witness lists, and summaries of testimony in accordance with the schedule set forth in Section II.7 or III.7, as applicable. For any proposed responsive witness who may present expert testimony, the summary of testimony shall be accompanied by a written report setting forth a complete statement of all opinions to be expressed and the basis and reasons therefor. Backup for any responsive exhibits shall be provided at the time the responsive exhibits are provided.

(f) Any proposed witness who has never testified before in the case of *Kansas v. Colorado*, No. 105, Original, or whose summary of testimony contains facts or opinions not disclosed during the discussions of experts, may be deposed. Depositions, which may

include a subpoena *duces tecum* shall be limited to the areas and documents not disclosed during the expert discussions and to the background, and qualifications of those witnesses who have never testified before in this case. For good cause shown and in accordance with these rules, the arbitrator(s) may order additional depositions.

(g) The arbitrator(s) is authorized to resolve any disputes concerning the exchange of information.

(h) Generally, hearings will be scheduled on consecutive days or in blocks of consecutive days in order to maximize efficiency and minimize costs.

(i) Each State shall present evidence to support its position. The other State shall then present evidence to support its position. Witnesses for each State shall also submit to questions from the arbitrator(s) and the adverse State. The arbitrator(s) has the discretion to vary this procedure provided that the States are treated with equality and that each State has the right to be heard and is given a fair opportunity to present its case.

(j) The arbitrator(s), exercising his or her discretion, shall conduct the proceedings with a view to expediting the resolution of the dispute and may direct the order of proof, bifurcate proceedings and direct the States to focus their presentations on issues the decision of which could dispose of all or part of the case.

(k) The States may agree to waive oral hearings.

R-22. Date and Time of Hearing

The arbitrator(s) shall set the date and time for each hearing, in accordance with the schedule set forth in Section II.7 or III.7, as applicable. The States shall respond to requests for hearing dates in a timely manner, be cooperative in scheduling the earliest practicable date, and adhere to the established hearing schedule.

R-25. Oaths

Before proceeding with the first hearing, each arbitrator(s) may take an oath of office and, if required by law, shall do so. Witnesses shall testify under oath.

R-26. Stenographic Record

A stenographic record shall be made of all substantive hearings and shall be the official record of the proceeding. A copy of the transcript shall be provided to the arbitrator(s) and each of the States.

R-28. Postponements

The arbitrator(s) may postpone any hearing upon agreement of the States, upon request of a State for good cause shown, or upon the arbitrator(s)'s own initiative, but in any case the arbitration hearings shall be completed no later than the date specified in the schedule set forth in Section II.7 or III.7, as applicable, unless otherwise agreed by the States.

R-31. Evidence

(a) The States may offer such evidence as is relevant and material to the dispute and shall produce such evidence as the arbitrator(s) may deem necessary to an understanding and determination of the dispute. Conformity to legal rules of evidence shall not be necessary. All evidence shall be taken in the presence of all the arbitrator(s) and both States, unless otherwise agreed to by both States.

(b) The arbitrator(s) shall determine the admissibility, relevance, and materiality of the evidence offered and may exclude evidence deemed by the arbitrator(s) to be cumulative or irrelevant.

(c) The arbitrator(s) shall take into account applicable principles of legal privilege, such as those involving the confidentiality of communications between a lawyer and client.

(d) The arbitrator(s) may subpoena witnesses or documents upon the request of any State, if necessary.

R-32. Post-hearing Filing of Documents or Other Evidence

If the States agree or the arbitrator(s) directs that documents or other evidence be submitted to the arbitrator(s) after the hearing, the documents or other evidence shall be filed with the arbitrator(s). Both States shall be afforded an opportunity to

examine and respond to such documents or other evidence.

R-35. Closing of Hearing

The arbitrator(s) shall specifically inquire of both States whether they have any further proofs to offer or witnesses to be heard. Upon receiving negative replies or if satisfied that the record is complete, the arbitrator(s) shall declare the hearing closed. If post-hearing briefs are to be filed, the hearing shall be declared closed as of the final date set by the arbitrator(s) for the receipt of briefs. If documents are to be filed as provided in Section R-32 and the date set for their receipt is later than that set for the receipt of briefs, the later date shall be the closing date of the hearing. The time limit within which the arbitrator(s) is required to make the decision shall commence, in the absence of other agreements by the States, upon the closing of the hearing.

R-36. Reopening of Hearing

The hearing may be reopened on the arbitrator(s)'s initiative, or upon application of a State, at any time before the decision is made. If reopening the hearing would prevent the making of the final decision of the arbitrator in accordance with the schedule set forth in Section II.7 or III.7, as applicable, the matter may not be reopened unless both States agree.

R-37. Waiver of Rules

A State that proceeds with the arbitration after knowledge that any provision or requirement of these rules has not been complied with and who fails to state an objection in a timely manner shall be deemed to have waived the right to object.

R-38. Extensions of Time

The States may modify any period of time by mutual agreement, provided that the modification will not prevent the final decision of the arbitrator(s) from being made in accordance with the schedule set forth in Section II.7 or III.7, as applicable, unless both States agree otherwise. The arbitrator(s) may for good cause extend any period of time established by these rules, except as otherwise provided herein.

R-39. Serving of Notice

(a) Any papers, notices, or process necessary or proper for the initiation or continuation of arbitration under these rules shall be served on counsel of record for each State in the same manner as service has been accomplished in *Kansas v. Colorado*, No. 105, Original.

(b) Any documents submitted by either State to the arbitrator(s) shall simultaneously be provided to the other State.

R-40. Majority Decision

When the panel consists of more than one arbitrator, a majority of the arbitrators shall make all decisions.

R-41. Time of Final Decision

The final decision shall be made by the arbitrator in accordance with the schedule set forth in Section II.7 or III.7, as applicable unless extended with the approval of the States.

R-42. Form of the Final Decision

(a) The final decision as to each issue shall be in writing and signed by a majority of the arbitrators if there is more than one arbitrator.

(b) The arbitrator(s) shall explain the reasons for each final decision.

R-43. Scope of Final Decision

The arbitrator(s) shall make a final decision as to each issue within the scope of these rules consistent with the applicable law and facts.

R-45. Delivery of Final Decision

The arbitrator(s) shall provide the original of each final decision to the Federal Representative, with copies to the counsel of record for each State. The arbitrator(s) shall provide the original transcript,

exhibits and other submittals on each issue to the Federal Representative at the same time or shortly thereafter.

R-46. Modification of Decision

Within five working days after the service of the States, any State may request the arbitrator(s) to correct any clerical, typographical, or computational errors in the decision. The arbitrator(s) is not empowered to re-determine the merits of any decision made. The other State shall be given five working days to respond to the request. The arbitrator(s) shall dispose of the request within 5 working days after transmittal to the arbitrator(s) of the request and any response thereto. For purposes of this rule, Rules 6(a) and (e) of the Federal Rules of Civil Procedure shall apply to the computation of time, except that "legal holiday" shall include any day appointed as a holiday by the President or Congress of the United States and all official state holidays of Kansas and Colorado.

R-48. Applications to Court and Exclusion of Liability

(a) No arbitrator in this proceeding is a necessary or proper party in judicial proceedings relating to the arbitration and cannot be called as a party or witness in *Kansas v. Colorado,* No. 105, Original.

(b) The parties to a binding arbitration conducted under these rules shall be deemed to have consented

that the decision of the arbitrator(s) is binding on all issues subject to arbitration as set forth in Section IV of this Appendix.

(c) The States shall be deemed to have consented that no arbitrator shall be liable to any State in any action for damages or injunctive relief for any act or omission in connection with any arbitration under these Rules.

R-50. Expenses

The States shall bear their own expenses, including attorneys' fees.

All other expenses of the arbitration, including the arbitrator's reasonable fees, fees of any expert or attorney hired to assist an arbitrator, travel and subsistence expenses, telephone and mailing costs, facility rental costs, copying, and printing, shall be borne equally by the States.

R-51. Arbitrator's Compensation

Arbitrators shall be compensated at a rate consistent with the arbitrator's agreed rate of compensation.

APPENDIX I

COLORADO MEASUREMENT RULES

APPENDIX I.1

Amended Rules Governing The Measurement Of Tributary Ground Water Diversions Located In The Arkansas River Basin

Revised November 30, 2005

AUTHORIZATION

In order for the State Engineer and Division Engineer for Water Division 2 to properly administer the waters of the Arkansas River basin and to comply with the Arkansas River Compact, it has become necessary to adopt amendments to the rules governing the measurement of tributary ground water diversions located in the Arkansas River Basin. The State Engineer's authority to promulgate the amendments to these rules is based on section 37-80-104, C.R.S., which requires the State Engineer to make and enforce such regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact commitments; section 37-92-501, C.R.S., which authorizes the State Engineer to adopt rules and regulations to assist in the performance of the administration, distribution and regulation of the waters of the state in accordance with the constitution of the state of Colorado; the provisions of Article 92 of Title 37 of the Colorado Revised Statutes (The Water Rights Determination and Administration Act of 1969) and other applicable laws; and section 37-92-502(5), C.R.S., which authorizes the State Engineer to order any owner or user of a water right to install

and maintain at such owner's or user's expense necessary meters, gauges, or other measuring devices and to report at reasonable times to the appropriate Division Engineer the readings of such meters, gauges or other measuring devices.

ORDER OF THE STATE ENGINEER

IT IS ORDERED that the following rules and amendments to the rules governing the measurement of tributary ground water diversions located in the Arkansas River Basin are adopted by the State Engineer.

Rule 1. Scope. These rules are applicable to all wells located in the Arkansas River basin except decreed and/or permitted wells as described in section 37-92-602, C.R.S.; wells located within a designated ground water basin; decreed and/or permitted nontributary wells; permitted wells subject to sections 37-90-137(4), C.R.S.; and wells permitted and decreed for not more than 50 gallons per minute that are part of a judicially approved plan for augmentation.

Rule 2. Definitions:

A. The following definitions are applicable to these rules governing the measurement of tributary ground water diversion located in the Arkansas River basin:

1. "Compound system" means a system where more than one electrical device is operated from the same electrical power meter.

2. "Complex system" means any system where the total dynamic head at the pump will vary due to multiple discharge locations in a pipeline, or where the method of delivery will vary between open discharge, gated pipe, or sprinkler system during a single irrigation season, or where multiple wells discharge into a common pipeline.

3. "Inactive well" means any well that is not in use and is disconnected from a power source.

4. "Power coefficient" means the amount of electrical energy expressed as kilowatt-hours (KWH) consumed in pumping one acre-foot of water.

5. "Tributary well(s)" are those wells that produce underground water and ground water as defined in section 37-92-103(II), C.R.S.

B. Any other term used in these rules that is defined in Article 90 or 92 of Title 37 is used with the meaning given therein.

Rule 3. All wells within the scope of these rules shall either, by July 15, 1994, be equipped with a totalizing flow meter that is installed and maintained according to manufacturer's specifications and recommendations or, by October 1, 1994, be rated to determine a power coefficient.

3.1.1 When a totalizing flow meter is used, it shall be the owner's responsibility to keep the meter in acceptable operating condition. Any meter designed and manufactured for the purpose of measuring the flow of water, and which has a totalizing feature, shall be

considered to be acceptable for purposes of these rules. The State Engineer may adopt standards and specifications for the installation, calibration, testing, repair, and maintenance of meters. An installed flow meter shall be determined to be in accurate operating condition when the indicated flow of the meter is within plus or minus 5% of an independent field measurement made using calibrated test equipment. Recalibration may be required by the Division Engineer if the Division Engineer determines an error was made.

3.1.2 As a minimum, totalizing flow meters shall be: properly verified in the field to be in accurate working condition under the supervision of an individual or entity approved annually by the State Engineer to do such tests when installed; contain sufficient recording digits to assure that "roll over" to zero does not occur within three years; and shall be maintained by the well owner so as to provide a continuous, accurate record of withdrawals. If the meter is not operational, the well shall not be pumped unless a working meter is installed or unless a specific backup water measurement program approved by the State Engineer is put into effect. Totalizing flow meters are required to be re-verified in the field to be in accurate working condition under the supervision of an individual or entity annually approved by the State Engineer every four years after the date of original installation and flow meters in existence as of July 5, 1994, shall be certified to be in accurate working condition under the supervision of an individual or entity annually

approved by the State Engineer by June 15, 1995, and reverified to be in accurate working condition every four years thereafter. The Division Engineer shall be provided notice of the re-verification on a form approved by the Division Engineer.

3.1.3 Re-verification of totalizing flow meters shall be required more frequently than every four years if any of the following occur: the meter has been damaged, repaired, or altered in a way affecting the accuracy of the meter; the meter installation configuration is altered in a way to affect the accuracy of the meter; or if the Division Engineer conducts or reviews tests and determines an error was made.

3.2 The State Engineer may adopt standards and specifications for power coefficient testing. As a minimum, power coefficients shall: be determined utilizing rating procedures approved by the State Engineer and conducted under the supervision of an individual or entity annually approved by the State Engineer to do such tests; be conducted when the pumping system has stabilized, i.e., both operating pressure and pumping drawdown has not changed more than 10% in the last hour; have been determined on or after April 1, 1992; include the pumping drawdown and operating pressure at the time the test was conducted; and be updated through re-rating at least every two years. The Division Engineer shall be provided notice of the re-rating on a form approved by the Division Engineer.

3.3 If the well(s) are part of a complex or compound system, or if the pump is driven by internal combustion means, the owner or user of the well must utilize the totalizing flow meter method (Rules 3.1.1 and 3.1.2), unless the provisions of Rule 3.6 are applicable. The State Engineer may require a separate totalizing flow meter for each discharge location of a complex system.

3.4 All flow measuring equipment utilized in verification of accuracy and working condition in the field and/or rating of wells must be calibrated biannually to be accurate within plus or minus 2%, unless a variance is granted by the Division Engineer.

3.5 Re-rating of power coefficients shall be required more frequently than every two years if any of the Following occur:

3.5.1 A new or re-worked pump and/or motor is installed on the well.

3.5.2 The well is re-worked to change the yield of the well.

3.5.3 The system that the pump discharges into is modified in such a manner as to change the power coefficient or the discharge of the pump.

3.5.4 Any other alteration to the system which changes the discharge of the pump or power coefficient.

3.5.5 Additional tests may also be required if the Division Engineer conducts or reviews tests and determines an error was made.

3.6 Owners and/or users of wells within the scope of these rules who use the power coefficient method and whose well discharges into a pressurized pipeline system with more than one point of discharge during a normal irrigation season must submit two Power Consumption Coefficient (PCC) measurements as required under the scope of these rules. One measurement must be taken under maximum head (minimum yield) and one measurement must be conducted under minimum head (maximum yield) conditions. A registered professional engineer, or a person approved upon written request to the State Engineer, must annually evaluate the range of pumping conditions and provide an analysis that determines the representative condition and PCC for that condition. This analysis must be provided within 30 days of the initiation of pumping for that year. If the Division Engineer determines that the operation of the well does not agree with the representative condition, the lower PCC will be used to compute pumping volumes.

Rule 4. All owners of wells within the scope of these rules who choose to install totalizing flow meters shall provide notice in writing to the Division Engineer for Water Division No. 2 by July 15, 1994, stating: the name and address of the owner of the well(s); the name and address of the user of the well(s) (if different than the owner); the well permit number(s); the decree or case number(s); the legal description of

the location of the well(s); the meter manufacturer; the meter model number; the meter size; the meter serial number(s); the volumetric units (gallons or acre-feet); the name of power utility company and power company account number (if applicable); the kilowatt hour meter reading on the date of installation (if applicable); the beginning totalizing flow meter reading; and the date of installation. Notification to the Division Engineer shall be on a form prescribed by the State Engineer. The Division Engineer shall be notified of any method of well measurement changes or changes in the above information on a form prescribed by the State Engineer.

Rule 5. All owners of wells within the scope of these rules who choose to utilize the power coefficient method shall provide notice in writing to the Division Engineer for Water Division No. 2 by October 1, 1994, stating: the name and address of the owner of the well(s); the name and address of the user of the well(s) (if different than the owner); the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); the power meter serial number(s); the utility company name; the power company account number; the power coefficient; the date of power coefficient rating; the kilowatt hour meter reading on the date of the power coefficient rating; the name and address of the State Engineer approved individual or entity supervising the power coefficient rating; the current transformer (C.T.) factor, if applicable; and the potential transformer (P.T.) factor, if applicable. Notification to the

Division Engineer shall be on a form prescribed by the State Engineer. The Division Engineer shall be notified of any method of well measurement changes or changes in the above information on a form prescribed by the State Engineer.

Rule 6. Data Submittal.

6.1 Data as to monthly amounts of water pumped from wells within the scope of these rules shall be for the period of November 1, to October 31, (coinciding with the Arkansas River compact year) and shall be filed with the Division Engineer no later than January 31, 1995 and every consecutive year thereafter. The submission of data as to the amounts diverted by any well(s) in conformance with the requirements of the Amended Rules and Regulations for the Diversion and Use of Tributary Ground Water in the Arkansas River basin shall be deemed sufficient to satisfy the requirements of this rule for such well(s) after January 31, 1997.

6.2 For the year 1994, owners utilizing the power coefficient method shall calculate the amount of water pumped using monthly power records for the period of November 1, 1993 through October 31, 1994.

6.3 Data shall be submitted on forms prescribed by the State Engineer. Such forms shall also include a consent to release power data to the Division Engineer. If a well user or owner's power account number changes for any reason, the user or owner must notify the Division Engineer of the new account number on

a form prescribed by the Division Engineer within 45 days following the change.

Rule 7 Inactive wells.

7.1.1 Inactive wells are excluded from these rules provided a sworn affidavit is filed with the Division Engineer by July 15, 1994 and March 1, every consecutive year thereafter, stating the status of the well as inactive. However, after March 1, 1996, inactive wells are excluded from these rules provided a sworn affidavit is filed with the Division Engineer within 30 days after the well has become inactive. Such sworn affidavit shall state that the well is inactive and shall include: the name and address of the owner of the well(s); the name and address of the user of the well(s), if different than the owner; the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); and a statement that the well(s) are disconnected from any power source. If the well owner desires to have the power to the well remain connected for any reason, approval of such must be first obtained from the State Engineer pursuant to Rule I 1[11]. Should the well(s) become active at any time, all aspects of these rules are immediately in effect. Notification to the Division Engineer shall be on a form prescribed by the State Engineer.

7.1.2 Once a sworn inactive well affidavit is filed with the Division Engineer, no further filings are required unless the owner or user wishes to remove the well from inactive status. When an owner or user desires

to change the well back to active status, notification to the Division Engineer is immediately required. No operation of the well can occur until such notification and compliance with all State Engineer rules and regulations has taken place.

Rule 8. No water shall be withdrawn from any well not in compliance with these rules except to determine a power coefficient or to install a totalizing flow meter.

Rule 9. Failure to comply with any of these rules will subject the well owner and/or user to court proceedings and the state's costs, including reasonable attorneys fees, associated with enforcement of these rules pursuant to section 37-92-503, C.R.S. Prior to filing any court action, the Division Engineer shall notify the well owner and/or user, as applicable, of the violation in writing and shall advise the well owner and/or user, as applicable, of the date by which the violation must be corrected to avoid court proceedings, which date shall be at least ten days following the mailing of the notice to the well owner and/or user or personal service on the well owner and/or user.

Rule 10. If any portion of these rules is found to be invalid, the remaining portion of the rules shall remain in force and unaffected.

Rule 11. When the strict application of any provisions of these rules would cause unusual hardship, the State Engineer may grant a variance for a specific instance provided a written request for the variance

is made to the State Engineer and the State Engineer finds the request justifiable.

IT IS FURTHER ORDERED that these amended rules shall become effective on the 1st day of March 2006, and shall remain in effect until amended as provided by law. Any person desiring to protest these rules may do so in the manner provided in section 37-92-501, C.R.S. Any such protest to these rules must be filed by the end of the month following the month in which these rules are published.

Dated this 30th day of November, 2005.

/s/ Hal D. Simpson
Hal D. Simpson
State Engineer

APPENDIX I.2

Agreement

Re: Amending the Measurement Rules regarding the use of Power Conversion Coefficients (PCCs) to determine Groundwater Pumping

The Colorado State Engineer has determined that a modification to the Amended Measurement Rules is necessary to require a re-rating of the power conversion coefficients at least every two years instead of every four years. The modification of Rule 3.2 would implement the re-rating every two years. In addition other regulations are proposed for modification to be consistent with that determination.

In a draft memorandum dated, August 23, 2005, from Steven J. Witte, Division Engineer, Colorado Water Division 2, the policy allowing variances from Rules 3.3 and 3.6 was proposed to be revoked.

Accordingly, we have agreed that: 1) the Amended Measurement Rules will be modified to include the changes shown in the attached copy of the rules and 2) the administration of those rules will be modified as set out in the attached draft memorandum dated, August 23, 2005, from Steven J. Witte to Approved Well Testers and Groundwater Associations.

Any change in the rules or policies that would diminish the effect of this tightening of the Amended Measurement Rules will need to be considered on its own merits by mutual agreement of both States.

Done this day *23* of September, 2005 in Denver, Colorado.

/s/ Hal D. Simpson
Hal D. Simpson,
Colorado State
Engineer

/s/ David L. Pope
David L. Pope,
Kansas Chief
Engineer

Attachments: Proposed modification of the Amended Measurement Rules.
Steven J. Witte Draft Memorandum of August 23, 2005.

APPENDIX I.2, ATTACHMENT 1

Amended Rules Governing The Measurement Of Tributary Ground Water Diversions Located In The Arkansas River Basin

Revised November 30, 2005, Hal D. Simpson, State Engineer, 1313 Sherman Street, #818, Denver, CO 80203 (Chad M. Wallace, Attorney for State Engineer Hal D. Simpson, Assistant Attorney General, Natural Resources Section, 1525 Sherman Street, 5th Floor, Denver, CO 80203)

AUTHORIZATION

In order for the State Engineer and Division Engineer for Water Division 2 to properly administer the waters of the Arkansas River basin and to comply with the Arkansas River Compact, it has become necessary to adopt amendments to the rules governing the measurement of tributary ground water diversions located in the Arkansas River Basin. The State Engineer's authority to promulgate the amendments to these rules is based on section 37-80-104, C.R.S., which requires the State Engineer to make and enforce such regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact commitments; section 37-92-501, C.R.S., which authorizes the State Engineer to adopt rules and regulations to assist in the performance of the administration, distribution and regulation of the waters of the state in accordance with the constitution

of the state of Colorado; the provisions of Article 92 of Title 37 of the Colorado Revised Statutes (The Water Rights Determination and Administration Act of 1969) and other applicable laws; and section 37-92-502(5), C.R.S., which authorizes the State Engineer to order any owner or user of a water right to install and maintain at such owner's or user's expense necessary meters, gauges, or other measuring devices and to report at reasonable times to the appropriate Division Engineer the readings of such meters, gauges or other measuring devices.

ORDER OF THE STATE ENGINEER

IT IS ORDERED that the following rules and amendments to the rules governing the measurement of tributary ground water diversions located in the Arkansas River Basin are adopted by the State Engineer.

Rule 1. Scope. These rules are applicable to all wells located in the Arkansas River basin except decreed and/or permitted wells as described in section 37-92-602, C.R.S.; wells located within a designated ground water basin; decreed and/or permitted nontributary wells; permitted wells subject to sections 37-90-137(4), C.R.S.; and wells permitted and decreed for not more than 50 gallons per minute that are part of a judicially approved plan for augmentation.

Rule 2. Definitions:

A. The following definitions are applicable to these rules governing the measurement of tributary ground water diversion located in the Arkansas River basin:

1. "Compound system" means a system where more than one electrical device is operated from the same electrical power meter.

2. "Complex system" means any system where the total dynamic head at the pump will vary due to multiple discharge locations in a pipeline, or where the method of delivery will vary between open discharge, gated pipe, or sprinkler system during a single irrigation season, or where multiple wells discharge into a common pipeline.

3. "Inactive well" means any well that is not in use and is disconnected from a power source.

4. "Power coefficient" means the amount of electrical energy expressed as kilowatt-hours (KWH) consumed in pumping one acre-foot of water.

5. "Tributary well(s)" are those wells that produce underground water and ground water as defined in section 37-92-103(II), C.R.S.

B. Any other term used in these rules that is defined in Article 90 or 92 of Title 37 is used with the meaning given therein.

Rule 3. All wells within the scope of these rules shall either, by July 15, 1994, be equipped with a totalizing flow meter that is installed and maintained according

to manufacturer's specifications and recommendations or, by October 1, 1994, be rated to determine a power coefficient.

3.1.1 When a totalizing flow meter is used, it shall be the owner's responsibility to keep the meter in acceptable operating condition. Any meter designed and manufactured for the purpose of measuring the flow of water, and which has a totalizing feature, shall be considered to be acceptable for purposes of these rules. The State Engineer may adopt standards and specifications for the installation, calibration, testing, repair, and maintenance of meters. An installed flow meter shall be determined to be in accurate operating condition when the indicated flow of the meter is within plus or minus 5% of an independent field measurement made using calibrated test equipment. Recalibration may be required by the Division Engineer if the Division Engineer determines an error was made.

3.1.2 As a minimum, totalizing flow meters shall be: properly verified in the field to be in accurate working condition under the supervision of an individual or entity approved annually by the State Engineer to do such tests when installed; contain sufficient recording digits to assure that "roll over" to zero does not occur within three years; and shall be maintained by the well owner so as to provide a continuous, accurate record of withdrawals. If the meter is not operational, the well shall not be pumped unless a working meter is installed or unless a specific backup water measurement program approved by the State Engineer is

put into effect. Totalizing flow meters are required to be re-verified in the field to be in accurate working condition under the supervision of an individual or entity annually approved by the State Engineer every four years after the date of original installation and flow meters in existence as of July 5, 1994, shall be certified to be in accurate working condition under the supervision of an individual or entity annually approved by the State Engineer by June 15, 1995, and reverified to be in accurate working condition every four years thereafter. The Division Engineer shall be provided notice of the re-verification on a form approved by the Division Engineer.

3.1.3 Re-verification of totalizing flow meters shall be required more frequently than every four years if any of the following occur: the meter has been damaged, repaired, or altered in a way affecting the accuracy of the meter; the meter installation configuration is altered in a way to affect the accuracy of the meter; or if the Division Engineer conducts or reviews tests and determines an error was made.

3.2 The State Engineer may adopt standards and specifications for power coefficient testing. As a minimum, power coefficients shall: be determined utilizing rating procedures approved by the State Engineer and conducted under the supervision of an individual or entity annually approved by the State Engineer to do such tests; be conducted when the pumping system has stabilized, i.e., both operating pressure and pumping drawdown has not changed more than 10% in the last hour; have been

determined on or after April 1, 1992; include the pumping drawdown and operating pressure at the time the test was conducted; and be updated through re-rating at least every two years. The Division Engineer shall be provided notice of the re-rating on a form approved by the Division Engineer.

3.3 If the well(s) are part of a complex or compound system, or if the pump is driven by internal combustion means, the owner or user of the well must utilize the totalizing flow meter method (Rules 3.1.1 and 3.1.2), unless the provisions of Rule 3.6 are applicable. The State Engineer may require a separate totalizing flow meter for each discharge location of a complex system.

3.4 All flow measuring equipment utilized in verification of accuracy and working condition in the field and/or rating of wells must be calibrated biannually to be accurate within plus or minus 2%, unless a variance is granted by the Division Engineer.

3.5 Re-rating of power coefficients shall be required more frequently than every two years if any of the Following occur:

3.5.1 A new or re-worked pump and/or motor is installed on the well.

3.5.2 The well is re-worked to change the yield of the well.

3.5.3 The system that the pump discharges into is modified in such a manner as to change the power coefficient or the discharge of the pump.

3.5.4 Any other alteration to the system which changes the discharge of the pump or power coefficient.

3.5.5 Additional tests may also be required if the Division Engineer conducts or reviews tests and determines an error was made.

3.6 Owners and/or users of wells within the scope of these rules who use the power coefficient method and whose well discharges into a pressurized pipeline system with more than one point of discharge during a normal irrigation season must submit two Power Consumption Coefficient (PCC) measurements as required under the scope of these rules. One measurement must be taken under maximum head (minimum yield) and one measurement must be conducted under minimum head (maximum yield) conditions. A registered professional engineer, or a person approved upon written request to the State Engineer, must annually evaluate the range of pumping conditions and provide an analysis that determines the representative condition and PCC for that condition. This analysis must be provided within 30 days of the initiation of pumping for that year. If the Division Engineer determines that the operation of the well does not agree with the representative condition, the lower PCC will be used to compute pumping volumes.

Rule 4. All owners of wells within the scope of these rules who choose to install totalizing flow meters shall provide notice in writing to the Division Engineer for Water Division No. 2 by July 15, 1994, stating: the name and address of the owner of the well(s);

the name and address of the user of the well(s) (if different than the owner); the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); the meter manufacturer; the meter model number; the meter size; the meter serial number(s); the volumetric units (gallons or acre-feet); the name of power utility company and power company account number (if applicable); the kilowatt hour meter reading on the date of installation (if applicable); the beginning totalizing flow meter reading; and the date of installation. Notification to the Division Engineer shall be on a form prescribed by the State Engineer. The Division Engineer shall be notified of any method of well measurement changes or changes in the above information on a form prescribed by the State Engineer.

Rule 5. All owners of wells within the scope of these rules who choose to utilize the power coefficient method shall provide notice in writing to the Division Engineer for Water Division No. 2 by October 1, 1994, stating: the name and address of the owner of the well(s); the name and address of the user of the well(s) (if different than the owner); the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); the power meter serial number(s); the utility company name; the power company account number; the power coefficient; the date of power coefficient rating; the kilowatt hour meter reading on the date of the power coefficient rating; the name and address of the State Engineer approved individual or entity supervising

the power coefficient rating; the current transformer (C.T.) factor, if applicable; and the potential transformer (P.T.) factor, if applicable. Notification to the Division Engineer shall be on a form prescribed by the State Engineer. The Division Engineer shall be notified of any method of well measurement changes or changes in the above information on a form prescribed by the State Engineer.

Rule 6. Data Submittal.

6.1 Data as to monthly amounts of water pumped from wells within the scope of these rules shall be for the period of November 1, to October 31, (coinciding with the Arkansas River compact year) and shall be filed with the Division Engineer no later than January 31, 1995 and every consecutive year thereafter. The submission of data as to the amounts diverted by any well(s) in conformance with the requirements of the Amended Rules and Regulations for the Diversion and Use of Tributary Ground Water in the Arkansas River basin shall be deemed sufficient to satisfy the requirements of this rule for such well(s) after January 31, 1997.

6.2 For the year 1994, owners utilizing the power coefficient method shall calculate the amount of water pumped using monthly power records for the period of November 1, 1993 through October 31, 1994.

6.3 Data shall be submitted on forms prescribed by the State Engineer. Such forms shall also include a consent to release power data to the Division Engineer. If a well user or owner's power account number

changes for any reason, the user or owner must notify the Division Engineer of the new account number on a form prescribed by the Division Engineer within 45 days following the change.

Rule 7 Inactive wells.

7.1.1 Inactive wells are excluded from these rules provided a sworn affidavit is filed with the Division Engineer by July 15, 1994 and March 1, every consecutive year thereafter, stating the status of the well as inactive. However, after March 1, 1996, inactive wells are excluded from these rules provided a sworn affidavit is filed with the Division Engineer within 30 days after the well has become inactive. Such sworn affidavit shall state that the well is inactive and shall include: the name and address of the owner of the well(s); the name and address of the user of the well(s), if different than the owner; the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); and a statement that the well(s) are disconnected from any power source. If the well owner desires to have the power to the well remain connected for any reason, approval of such must be first obtained from the State Engineer pursuant to Rule I 1[11]. Should the well(s) become active at any time, all aspects of these rules are immediately in effect. Notification to the Division Engineer shall be on a form prescribed by the State Engineer.

7.1.2 Once a sworn inactive well affidavit is filed with the Division Engineer, no further filings are required

unless the owner or user wishes to remove the well from inactive status. When an owner or user desires to change the well back to active status, notification to the Division Engineer is immediately required. No operation of the well can occur until such notification and compliance with all State Engineer rules and regulations has taken place.

Rule 8. No water shall be withdrawn from any well not in compliance with these rules except to determine a power coefficient or to install a totalizing flow meter.

Rule 9. Failure to comply with any of these rules will subject the well owner and/or user to court proceedings and the state's costs, including reasonable attorneys fees, associated with enforcement of these rules pursuant to section 37-92-503, C.R.S. Prior to filing any court action, the Division Engineer shall notify the well owner and/or user, as applicable, of the violation in writing and shall advise the well owner and/or user, as applicable, of the date by which the violation must be corrected to avoid court proceedings, which date shall be at least ten days following the mailing of the notice to the well owner and/or user or personal service on the well owner and/or user.

Rule 10. If any portion of these rules is found to be invalid, the remaining portion of the rules shall remain in force and unaffected.

Rule 11. When the strict application of any provisions of these rules would cause unusual hardship,

the State Engineer may grant a variance for a specific instance provided a written request for the variance is made to the State Engineer and the State Engineer finds the request justifiable.

IT IS FURTHER ORDERED that these amended rules shall become effective on the 1st day of March 2006, and shall remain in effect until amended as provided by law. Any person desiring to protest these rules may do so in the manner provided in section 37-92-501, C.R.S. Any such protest to these rules must be filed by the end of the month following the month in which these rules are published.

APPENDIX I.2, ATTACHMENT 2

STATE OF COLORADO

WATER DIVISION 2
OFFICE OF THE STATE ENGINEER
Security Services Building, 310 East Abriendo, Suite B
Pueblo, Co. 81002
Phone (719) 542-3368
FAX (719)544-0800 (SEAL)

Bill Owen
Governor
Russel George
Executive Director
Hal Simpson
State Engineer
Steven J. Witte, P.E.
Division Engineer

DRAFT MEMORANDUM
August 23, 2005

TO: APPROVED WELL TESTERS
GROUNDWATER ASSOCIATIONS

FROM: Steven J. Witte

SUBJECT: Revocation of Variance Approval Policy for Complex Wells Using the PCC Method dated June 14, 2000

You will recall that Rule 3.3 of the Amended Rules Governing the Measurement of Tributary Ground

Water Diversions Located in the Arkansas River Basin (Amended Measurement Rules) states:

> If the well(s) are part of a complex or compound system, or if the pump is driven by internal combustion means, the owner or user of the well must utilize the totalizing flow meter method (Rules 3.1.1 and 3.1.2), unless the provisions of Rule 3.6 are applicable.

Rule 3.6 provides as follows:

> Owners and/or users of wells within the scope of these rules who use the power coefficient method and whose well discharges into a pressurized pipeline system with more that [sic] one point of discharge during a normal irrigation season must submit two Power Consumption Coefficient (PCC) measurements as required under the scope of these rules. One measurement must be taken under maximum head (minimum yield) and one measurement must be conducted under minimum head (maximum yield) conditions. A registered professional engineer, or a person approved upon written request to the State Engineer, must annually evaluate the range of pumping conditions and provide an analysis which determines the representative condition and PCC for that condition. This analysis must be provided within 30 days of the initiation of pumping for the year. If the Division Engineer determines that the operation of the well does not agree with the representative condition, the lower PCC will be used to compute pumping volumes.

From the foregoing, it is apparent that the intent of the Amended Measurement Rules is to allow a limited exception to Rule 3.3 that seeks to produce an accurate estimate of pumping volumes through the use of a PCC that corresponds to a representative operating condition. Only in the case of a disagreement are provisions for a conservative estimate allowed.

Over the course of time a departure from the literal terms of the rules has developed through the variance procedure whereby use of the PCC method has been allowed for complex systems that do not conform with the limited exception described in Rule 3.6 and allowed a less rigorous procedure for determining a PCC to be used to compute pumping volumes than is described in that rule. The premise for approval of this departure from the Amended Measurement Rules has been that the amount of water would be over-estimated. This departure has been described as a policy in memoranda circulated to well testers and well associations in the Arkansas River valley dated March 11, 1999 and June 14, 2000.

In a recent report produced by the United States Geological Survey (Scientific Investigations Report 2005-5063) it was found that based on an analysis done to quantify the differences in pumpage at complex sites, depending on whether PCC measurements were made under low total dynamic head or high total dynamic head conditions, that pumpage estimated by the PCC method was 6 to 7 percent greater than pumpage measured by a totalizing flow meter

for complex sites using a low total dynamic head PCC. The State Engineer has determined that this difference is excessive.

For this reason, the various informal policies describing conditions under which variances to Rule 3.3 and 3.6 of the Amended Measurement Rules have been allowed are revoked effective as of November 1, 2005. Furthermore, for any well that is part of a complex system for which a PCC has been determined and accepted based upon the policies described above, the owner or user must by no later than June 1, 2006 have a measurement method conforming to the requirements of Rules 3.3, 3.6 or 7.

APPENDIX J

COLORADO USE RULES AND SPECIAL RULES

APPENDIX J.1

Amended
Rules And Regulations
Governing The Diversion And Use
Of Tributary Ground Water
In The Arkansas River Basin, Colorado
(Filed June 4, 1996)

ORDER OF THE STATE ENGINEER

IT IS ORDERED that the Rules and Regulations governing the use, control, and protection of surface and ground water rights located in the Arkansas River and its tributaries, which rules and regulations became effective on February 19, 1973, shall be amended and replaced by the following rules and regulations which are adopted and approved by the state engineer.

AMENDED RULES AND REGULATIONS

Rule 1. *Scope*. These Rules apply to all diversions of tributary ground water in the Arkansas River Basin in Colorado except diversions by decreed or permitted wells as described in section 37-92-602, wells located within a designated ground water basin which withdraw designated ground water, decreed and/or permitted wells which withdraw nontributary ground water, and exposure of ground water in connection with extraction of sand and gravel by open mining as defined in section 34-32-103 (9), 14 C.R.S.

In addition, these Rules shall not apply to ground water within the Dawson, Denver, Arapahoe, or Laramie-Fox Hills aquifers in the Denver Basin, as shown on the attached map, or to ground water within the Cheyenne and Dakota aquifers.

Rule 2. *Definitions*.

The following definitions are applicable to these Rules:

a. "Decreed pre-compact ground water rights" mean water rights to divert tributary ground water in the Arkansas River Basin in Colorado with a priority senior to December 14, 1948, awarded in (1) decrees entered prior to June 7, 1969; or (2) decrees which were entered in proceedings which were pending on that date; or (3) decrees which were entered on or after June 7, 1969, by the Water Judge for Water Division 2, with respect to water rights which are diverted by means of wells, the priorities for which had not been established or sought in any prior decree or proceeding, if the person claiming the water right filed an application for determination of the water right and priority not later than July 1, 1972, and such application was approved and confirmed by the Water Judge for Water Division 2.

b. "Division engineer" means the division engineer for Water Division 2.

c. "Durbin usable flow method with the Larson coefficients" means the Durbin approach to determine depletions to usable Stateline flow with

modifications made by Steven Larson, as described in the July 1994 Report by Arthur L. Littleworth, Special Master, in *Kansas v. Colorado*, No. 105, Original, United States Supreme Court.

d. "Kansas Hydrologic-Institutional Model" means the computer model, as revised by the Kansas replacement experts, used to determine depletions to Stateline flow in *Kansas v. Colorado*, No. 105, Original, United States Supreme Court, as described in the July 1994 Report by Arthur L. Littleworth, Special Master.

e. "Out-of-priority depletions to senior surface water rights in Colorado" mean stream depletions caused by diversions of tributary ground water in the Arkansas River Basin in Colorado which would deprive senior surface water rights in Colorado of the amount of water to which said surface water rights would have been entitled in the absence of such ground water diversions.

f. "Post-compact ground water diversions" mean (1) diversions of tributary ground water from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by well users having water rights with a priority of, or junior to, December 14, 1948, and (2) diversions of tributary ground water by well users having decreed pre-compact water rights for irrigation use in excess of the pre-compact pumping allowances of such rights, except to the extent permitted by Rule 3.3.

g. "Stream depletions" means depletions to the Arkansas River or other natural streams in the Arkansas River Basin in Water Division 2 caused by diversions of tributary ground water in the Arkansas River Basin in Colorado.

h. "Tributary ground water in the Arkansas River Basin in Colorado" means all underground water as defined in section 37-92-103 (11), 15 C.R.S., in the State of Colorado tributary to the Arkansas River or other natural streams in the Arkansas River Basin in Water Division 2.

i. "Unit response functions" mean a mathematical method to determine the timing and location of stream depletions or accretions from a unit stress on an aquifer.

j. "Usable Stateline flow" means the flow of waters of the Arkansas River, as defined in Article III of the Arkansas River Compact, as determined by gaging stations located at or near the Stateline in accordance with the Arkansas River Compact, the depletion of which would materially deplete waters of the Arkansas River in usable quantity or availability for use to the water users in Kansas under the Arkansas River Compact.

k. "Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline" mean those aquifers as delineated on the attached map.

l. "Waters imported into the Arkansas River Basin" or "imported waters" mean waters brought into the Arkansas River Basin from other river basins.

m. "Well user" means the owner of a water right to divert tributary ground water in the Arkansas River Basin in Colorado and any person having the right to use such a water right owned by another, including successors, lessees, contractees, or assigns.

n. Any other term used in these Rules that is defined in Article 90 or 92, 15 C.R.S., or in Article III of the Arkansas River Compact, is used with the meaning given therein.

Rule 3. *Ground Water Diversions and Depletions Affecting Usable Stateline Flow*.

Rule 3.1. *Ground Water Diversions for Irrigation Use by Post-compact Ground Water Rights Affecting Usable Stateline Flow*. On or after June 1, 1996, all diversions of tributary ground water for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by well users having water rights with a priority of, or junior to, December 14, 1948, shall be totally discontinued unless depletions to usable Stateline flow caused by such diversions are replaced in accordance with a plan approved by the state and division engineers pursuant to these Rules.

Rule 3.2. *Ground Water Diversions for Irrigation Use By Decreed Pre-Compact Ground Water*

Rights Affecting Usable Stateline Flow. On or after June 1, 1996, all diversions of tributary ground water for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by well users having decreed pre-compact ground water rights shall be limited to an aggregate total of 15,000 acre-feet per year (November 1 through October 31) unless depletions to usable Stateline flow caused by diversions of amounts greater that 15,000 acre-feet per year are replaced in accordance with a plan approved by the state and division engineers pursuant to these Rules.

Rule 3.3. *Pre-compact Pumping Allowances*. For the purpose of implementing Rule 3.2, each decreed pre-compact ground water right for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline shall be allocated an annual pre-compact pumping allowance for the purpose of determining depletions to usable Stateline flow. The annual pre-compact pumping allowance for each decreed pre-compact ground water right for irrigation use shall be determined by multiplying 15,000 acre-feet times the decreed capacity of that ground water right, weighted depending on whether the ground water right is used as a supplemental or as a sole source supply, and dividing by the total weighted decreed capacity of all decreed pre-compact ground water rights for irrigation use. Ground water rights used as a supplemental supply shall be given a weight of sixty percent (60%) and ground water rights used as a sole source supply

shall be given a weight of one-hundred percent (100%). The state and division engineers shall prepare a list of all decreed pre-compact ground water rights for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by the effective date of these Rules, which list shall set forth the annual pre-compact pumping allowance for each such right. A well user having a decreed pre-compact ground water right for irrigation use may divert more than the annual pre-compact pumping allowances of that right in any one year (November 1 through October 31), provided, that the well user having such a right is included in a plan approved by the state and division engineers which includes other well users having such rights and who will not divert more than their combined annual pre-compact pumping allowances in any one year unless they replace depletions to usable Stateline flow caused by such additional diversions. *Notwithstanding this annual pre-compact pumping allowance, well users having decreed pre-compact ground water rights for irrigation use shall be subject to all other rules and regulations applicable to diversions of tributary ground water in the Arkansas River Basin in Colorado, including replacement of out-of-priority depletions to senior surface water rights in Colorado pursuant to Rule 4.1.*

Rule 3.4. *Determination of Depletions to Usable Stateline Flows*. The state and division engineers shall use the Kansas Hydrologic-Institutional Model (HIM) and the Durbin usable flow method with the

Larson coefficients, or such other method approved by the Special Master, the United States Supreme Court, or the Arkansas River Compact Administration to determine depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use. To the extent that replacement of out-of-priority depletions to senior surface water rights in Colorado in accordance with these Rules is not sufficient to replace all depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use, the state and division engineers shall allocate all unreplaced depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use to well users based upon the well's location, the amount pumped, whether the well is a sole source or supplemental source of supply, the method of irrigation, and such other information as is available to the state and division engineers to allocate such unreplaced depletions, and taking into account reductions in depletions to usable Stateline flow resulting from augmentation water provided in accordance with these Rules, including return flows from imported or other fully consumable waters to which well users, or their successors, lessees, contractees, or assigns are entitled based on their right to use or reuse such return flows.

Rule 3.5. *Conditions for Approval of Plans Allowing Post-compact Ground Water Diversions*. As a condition to approval of any plan allowing post-compact ground water diversions for irrigation use, the state and division engineers shall require

replacement of any and all depletions to usable Stateline flow and may require a well user or entity acting on behalf of well users to furnish water in advance to replace anticipated depletions to usable Stateline flow which will not be replaced by replacement of out-of-priority depletions to senior surface water rights in Colorado.

Rule 4. *Ground Water Diversions from the Valley Fill Aquifer and Other Specified Aquifers Affecting Senior Surface Water Rights in Colorado*.

Rule 4.1 Diversions of Tributary Ground Water from the Valley Fill Aquifer and Other Specified Aquifers Affecting Senior Surface Water Rights in Colorado. On or after June 1, 1996, all diversions of tributary ground water

a. from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline; and

b. from the alluvium of Fountain Creek and the alluvium of the Arkansas River from Pueblo to Pueblo Dam, as shown on the attached map,

shall be totally discontinued unless out-of-priority depletions to senior surface water rights in Colorado are replaced in accordance with: (1) a decreed plan for augmentation approved by the Water Judge in accordance with the procedures of sections 37-92-302 to 37-92-305, 15 C.R.S.; or (2) a plan approved by the state and division engineers in accordance with these Rules; or (3) a substitute supply plan approved by the

state engineer pursuant to section 37-80-120 which is consistent with these Rules. Replacement of depletions in accordance with this Rule shall not relieve a well user of an obligation to replace depletions to usable Stateline flow.

Rule 4.2. *Determination of Stream Depletions; Presumptive Stream Depletions*. To determine stream depletions for plans required by Rule 4.1, the state and division engineers shall be governed by the following:

a. For diversions of ground water used as a supplemental supply for flood and furrow irrigation, the presumptive stream depletions shall be thirty percent (30%) of the amount diverted. The state and division engineers may increase the presumptive stream depletions to more than thirty percent (30%), but not more than the presumptive stream depletions for diversions of ground water used as a sole source of supply for flood and furrow irrigation, for well users who use ground water as a supplemental supply for flood and furrow irrigation but do not have a reasonably adequate surface supply for the acreage irrigated (for example, well users who have sold a portion of their surface water rights or do not own sufficient shares in a mutual ditch company to irrigate the acreage irrigated compared to other shareholders in the company). To determine whether a well user has a reasonably adequate surface supply for the acreage irrigated, the state and division engineers shall consider the acreage which may be legally irrigated with the surface water rights owned or used

by the well user and the relative amount of surface and ground water applied to such acreage averaged over the previous five years. The following table may be used as a guideline for increasing the presumptive stream depletions:

Surface Water Used (%)	Flood/Furrow Depletion (%)
50 or greater	30
40-49	33
30-39	36
20-29	39
10-19	42
1-9	45
0	50

b. For diversions of ground water used as a sole source of supply for flood and furrow irrigation, the presumptive stream depletions shall be fifty percent (50%) of the amount diverted.

c. For diversions of ground water used as a sole source of supply in sprinkler irrigation systems, the presumptive stream depletions shall be seventy-five percent (75%) of the amount diverted.

d. For diversions of ground water for other uses, the state and division engineers shall determine stream depletions based on information submitted by the well user and the individual facts and circumstances of each case or may establish presumptive stream depletions for particular uses.

Rule 4.3. *Review and Revision of Presumptive Stream Depletions*. The presumptive stream depletions established in Rule 4.2 shall be reviewed by the state engineer annually to determine whether the presumptive stream depletions are adequate to prevent material injury to senior surface water rights in Colorado and depletions to usable Stateline flows, and the presumptive stream depletions shall be revised as the state engineer determines is necessary. The state engineer shall publish any revisions to the presumptive stream depletions in the manner prescribed by statute for changes to these Rules and regulations.

Rule 5. *Other Diversions of Tributary Ground Water Affecting Senior Surface Water Rights in Colorado*. On or after June 1, 1996, all diversions of tributary ground water in the Arkansas River Basin within the scope of these Rules and not covered by Rule 4.1 shall be totally discontinued unless out-of-priority depletions to senior surface water rights in Colorado are replaced in accordance with: (1) a decreed plan for augmentation approved by the Water Judge in accordance with the procedures of sections 37-92-302 to 37-92-305, 15 C.R.S.; or (2) a plan approved by the state and division engineers in accordance with these Rules; or (3) a substitute supply plan approved by the state engineer pursuant to section 37-80-120 which is consistent with these Rules. To determine stream depletions for plans required by this Rule, the state and division engineers shall determine such depletions based on an

acceptable site-specific depletion analysis provided by the well user or plan proponent or, in the absence of such an analysis, shall determine stream depletions in accordance with Rule 4.2.

Rule 6. *Criteria for Determining the Adequacy of Augmentation Water*. In reviewing plans submitted pursuant to these Rules, the state and division engineers shall determine the adequacy of each source of water proposed for use as augmentation water, including, where necessary, the historical consumptive use of each water right. This determination shall be based upon acceptable studies of the augmentation source provided by the well user or plan proponent. Return flows from diversions of waters imported into the Arkansas River Basin or other fully consumable waters proposed for use as augmentation water shall be determined by the state and division engineers based on acceptable studies and information provided by the well user or plan proponent. A water right, other than imported waters or other fully consumable waters, which has not been decreed for augmentation use may be used as augmentation water in a plan approved by the state and division engineers pursuant to these Rules; however, as a condition to approval of a plan, the state and division engineers may require the well user or plan proponent to file an application for change of water right and obtain a decree approving the use of the water right for augmentation use within a reasonable period of time. In no case, however, shall a water right, other than imported waters or other fully consumable waters,

which has not been decreed for augmentation use be used as a permanent source of augmentation water for more than 10 years in a plan approved by the state and division engineers pursuant to these Rules.

Rule 7. *Conditions for Approval of Plans*. Based on stream depletions determined in accordance with these Rules, the state and division engineers may approve a plan to divert tributary ground water which provides sufficient augmentation water in amount, time, and location to replace out-of-priority depletions to senior water rights in Colorado and any and all depletions to usable Stateline flow caused by such diversions. Acceptable plans shall be approved annually and shall include such terms and conditions as, in the opinion of the state and division engineers, are necessary to prevent injury to senior surface water rights in Colorado and depletions to usable Stateline flow. Plans may be amended during the year if approved by the state and division engineers. As a condition to approval of a plan, the state and division engineers may require augmentation water in excess of the amount necessary to replace stream depletions determined in accordance with Rule 4.2 or Rule 5 to address situations where projected augmentation water may not be available, such as a dry year.

Rule 8. *Determination of the Timing and Location of Stream Depletions; Unit Response Functions*. To determine the timing and location of stream depletions caused by diversions of tributary ground water, the state and division engineers shall develop unit response functions for wells diverting from the

Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline. These unit response functions may be used to determine the timing and location of return flows from diversions of imported waters and other fully consumable waters. To determine the timing and location of stream depletions caused by other diversions of tributary ground water, water users may use appropriate ground water models or other methods acceptable to the state and division engineers to calculate the timing and location of stream depletions based on the location of the well, the rate of pumping, the use being made of the ground water, and the aquifer's boundaries and characteristics.

Rule 9. *Responsibilities of the State and Division Engineers*. The state and division engineers shall administer, distribute, and regulate ground water within the scope of these Rules in accordance with the provisions of the Arkansas River Compact, the constitution of the state of Colorado and other applicable laws, and written instructions and orders of the state engineer, including these Rules, and no other official, board, commission, department, or agency of the state of Colorado, except as provided in article 92 of title 37, C.R.S., and article 8 of title 25, C.R.S., has jurisdiction and authority with respect to said administration, distribution, and regulation. The state and division engineers shall curtail all diversions of ground water within the scope of these Rules, the depletions from which are not replaced as to prevent out-of-priority depletions to senior water rights in

Colorado and depletions to usable Stateline flow in accordance with these Rules.

Rule 10. *Responsibilities of Well Users and Other Entities Subject to These Rules*. Well users alone or in concert may submit plans in accordance with these Rules. Water conservancy districts, irrigation districts, mutual or public ditch and reservoir companies, municipalities, or other entities which are governed by a board of directors may initiate and submit plans in accordance with these Rules. Well users shall be responsible for complying with these Rules, verifying the accuracy of information submitted in accordance with these Rules, and complying with the terms and conditions of plans approved in accordance with these Rules. Water conservancy districts, irrigation districts, mutual or public ditch and reservoir companies, municipalities, or other entities which are governed by a board of directors which initiate and submit plans in accordance with these Rules shall be responsible for notifying the state and division engineers of any well user in a plan approved in accordance with these Rules who is not in compliance with the terms of the plan and for doing all things required by such plans; however, the state and division engineers shall be responsible for enforcement of these Rules and the terms of the Arkansas River Compact; and, notwithstanding the submission of a plan by an entity on behalf of a well user, should the plan prove insufficient, the well user shall be responsible for replacement of out-of-priority

depletions to senior surface rights in Colorado and depletions to usable Stateline flow.

Rule 11. *Plans for June 1, 1996 to March 31, 1997, and Thereafter*. To provide a reasonable period to allow well users to develop plans required by these Rules and to secure the augmentation water necessary for such plans, the state and division engineers may approve a plan to divert tributary ground water for the period June 1, 1996, to March 31, 1997, if the well user or an entity acting on behalf of the well user provides sufficient augmentation water in amount, time, and location to replace 60 percent (60%) of the out-of-priority depletions to senior surface water rights in Colorado determined in accordance with these Rules and all depletions to usable Stateline flow caused by such diversions. On or after April 1, 1997, full replacement of out-of-priority depletions to senior surface rights in Colorado and depletions to usable Stateline flow shall be required and no plan shall be approved which does not provide for full replacement of such depletions in accordance with these Rules.

Rule 12. *Submission of Monthly Pumping or Power Records*. Any well user or entity acting on behalf of well users who desires approval of a plan to divert tributary ground water pursuant to these Rules must furnish records to the division engineer, in a manner prescribed by the division engineer, on a monthly basis, or a less frequent basis if authorized by the division engineer, of the amounts diverted pursuant to the plan. In the case of wells powered by electricity, as a condition to approval of a plan, the

well user must authorize the power supplier to provide power records to the division engineer on a monthly basis. Further, if authorized by statute, in the event the well user fails to comply with the terms of a plan approved pursuant to these Rules or fails to furnish or pay for augmentation water necessary for such a plan, the state or division engineer may issue an order to the power supplier to discontinue energy to the well unless and until the well user has complied with the terms of such a plan or furnished or paid for augmentation water necessary for such a plan.

Rule 13. *Information Which Must Be Furnished*. By June 1, 1996, and by February 1 of each year thereafter (except as provided below), any well user who desires approval of a plan to divert tributary ground water pursuant to these Rules, or will be included in a plan submitted by an entity on behalf of the well user, shall file a signed statement with the division engineer, on a form approved by the division engineer, containing the following information for each well used by the well user to be included in the plan:

a. the name, address and telephone number of the well user and the well owner, if different than the well user;

b. the name of the entity which will provide augmentation water;

c. the location of each well;

d. the structure identification number (if one has been assigned) of each well. If no structure identification number has been assigned to a well, the well user shall also furnish the following information:

(1) the permit or registration number of each well,

(2) the appropriation date and adjudication date of each water right diverted through each well,

(3) the court case number of the proceeding in which each water right diverted through each well was decreed;

e. the use of ground water diverted from each well;

f. the source of energy used to divert ground water from each well;

g. in the case of wells powered by electricity, the name of the electric utility company which supplies energy used to divert ground water from each well, the power meter/service number as it appears on the bill from the electric utility company, and the account number;

h. in the case of wells used for irrigation,

(1) whether each well is used as a supplemental irrigation supply or a sole source of irrigation supply,

(2) the method of irrigation (flood, furrow, sprinkler, surge, drip, etc.) of each well,

(3) if used as a supplemental irrigation supply, a description of the surface rights or the name of the ditch or reservoir company and number of shares used in conjunction with each well; and

i. in the case of diversions of ground water for uses other than irrigation, information sufficient to allow the state and division engineers to determine stream depletions.

An entity acting on behalf of well users may compile and submit the foregoing information for well users in a manner acceptable to the division engineer, but the well user must sign a statement on a form approved by the division engineer which verifies the information submitted by the entity. These forms shall be maintained in the files of the entity and a copy furnished to the division engineer. If a well user fails to file a statement in compliance with this Rule, the state and division engineers may deny a plan to divert tributary ground water or require the well user to be excluded from a plan submitted by an entity on behalf of the well user until the well user has complied with this Rule.

Once a well user has filed a signed statement with the division engineer in compliance with this Rule, or an entity acting on behalf of the well user has submitted the foregoing information for the well user in compliance with this Rule, the well user shall not be required to submit a statement thereafter to be

included in a plan unless any information on the statement has changed; however, the state and division engineers may require any well user to provide additional information in the future to determine whether the well user has a reasonably adequate surface supply.

Rule 14. *Applications for Approval of Plans to Divert Tributary Ground Water*. No later than June 1, 1996, and no later than March 1 of each year thereafter, a well user or an entity acting on behalf of well users who desires approval of a plan to divert tributary ground water pursuant to these Rules must file with the division engineer an application in writing setting forth a complete description of the plan, including:

a. the name and address of each well user who will be included in the plan;

b. the information required in paragraphs c. through i. of Rule 13 for each well which will be included in the plan;

c. an estimate of the amount of ground water to be diverted by well users who will be included in the plan;

d. each source of water to be used as augmentation water in the plan and the amount of augmentation water available on a monthly basis;

e. the amount, time, and location of stream depletions from ground water diversions under the

plan or how the amount, time, and location of such depletions will be determined; and

f. a detailed description of how out-of-priority depletions to senior water rights in Colorado and depletions to usable Stateline flow will be replaced under the plan.

If a well user or entity acting on behalf of well users who seeks approval of a plan to divert tributary ground water pursuant to these Rules does not know every source of water to be used as augmentation water in a plan or the amount of augmentation water available by March 1 of any given year, the state and division engineers may grant temporary approval of a plan until June 1 upon such terms and conditions as, in the opinion of the state and division engineers, will be adequate to prevent out-of-priority depletions to senior surface water rights in Colorado and depletions to usable Stateline flow until the well user or entity acting on behalf of well users can provide a complete description of the plan.

Rule 15. *Orders, Costs, and Attorneys' Fees*. Any person who diverts ground water in violation of these Rules or in violation of the terms of a plan approved by the state and division engineers pursuant to these Rules shall be subject to an order by the state or division engineer issued pursuant to section 37-92-502, 15 C.R.S., and may be subject to court proceedings and the state's costs, including, reasonable attorney fees, and any fine authorized by statute. Because ground water diversions in violation of these

Rules could deplete usable Stateline flows in violation of the Arkansas River Compact or cause material injury to water rights in Colorado having senior priorities, the state or division engineer may enter upon, and order any person to permit the entry upon, private property to plug, lock, or otherwise disable any well which has been used to divert ground water in violation of these Rules or in violation of a plan approved pursuant to these Rules.

Rule 16. *Tabulation, Pumping Records, and Summaries of Plans*. To ensure compliance with these Rules, the state and division engineers shall tabulate diversions of ground water from the aquifers listed in Rule 4.1 at regular intervals and shall make such tabulations available for inspection by the public in the office of the division engineer. The state and division engineers shall prepare annual summaries of plans which have been approved by the state and division engineers allowing diversions of ground water from the aquifers listed in Rule 4.1 and shall make such summaries available for inspection by the public in the office of the division engineer. As a condition to approval of any plan to divert ground water pursuant to these Rules, the state and division engineers may require a well user or an entity submitting a plan on behalf of well users to prepare a summary of diversions of ground water and replacement of depletions under the plan.

Rule 17. *Severability*. If any portion of these Rules is found to be invalid, the remaining portion of the Rules shall remain in force and unaffected.

Rule 18. *Effective Date*. These amended Rules shall become effective June 1, 1996, and shall remain in effect until amended as provided by law. The Statement of Basis and Purposes for these Rules has been filed with the water court and is available for review at the office of the state engineer in Denver, Colorado and at the office of the division engineer in Pueblo, Colorado.

Dated this 4th day of June, 1996.

STATE OF COLORADO

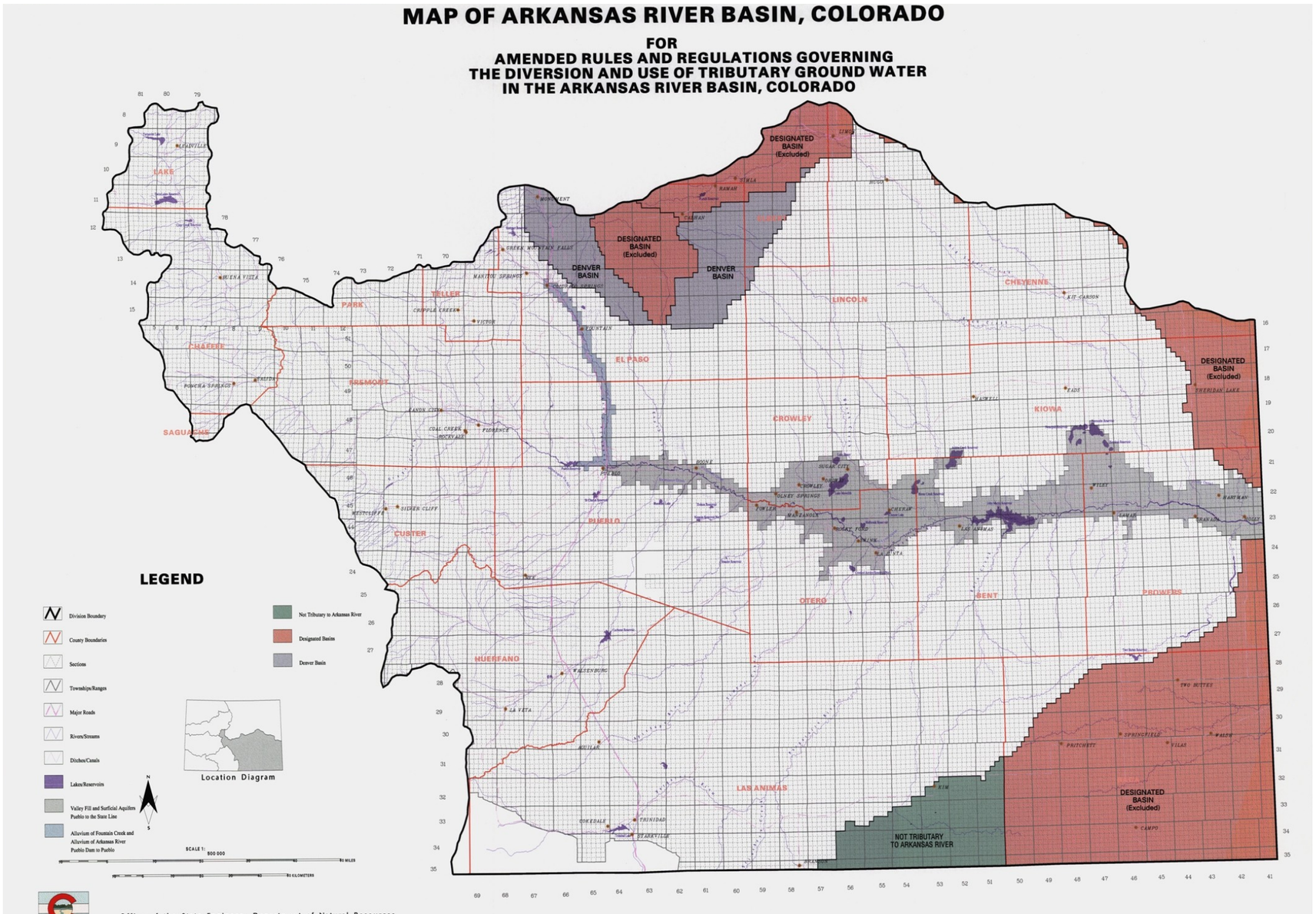
/s/ Hal D. Simpson
HAL D. SIMPSON
State Engineer

BY THE COURT

/s/ John Anderson
JOHN ANDERSON
Water Court Judge
Water Division 2
State of Colorado

MAP OF ARKANSAS RIVER BASIN, COLORADO

FOR AMENDED RULES AND REGULATIONS GOVERNING THE DIVERSION AND USE OF TRIBUTARY GROUND WATER IN THE ARKANSAS RIVER BASIN, COLORADO



Office of the State Engineer Department of Natural Resources
Division of Water Resources September 1995

APPENDIX J.2

Additional Requirements For Post-1985 Uses

1. *100% Replacement Required*: All depletions caused by post-1985 water uses in the Arkansas River Basin in Colorado shall be fully replaced with no reduction for usability.

2. *Exception*: Notwithstanding the foregoing, no Replacement shall be required for depletions caused by post-1985 water uses if John Martin Reservoir is spilling and Stateline water is passing Garden City, Kansas.

APPENDIX K

ARKANSAS RIVER COMPACT

APPENDIX K

The Arkansas River Compact As Enacted By Congress 63 Stat. 145 (1949)

AN ACT

To grant the consent of the United States to the Arkansas River compact.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby given to the compact, signed (after negotiations in which a representative of the United States, duly appointed by the President, participated, and upon which he has reported to the Congress) by the Commissioners for the States of Colorado and Kansas on December 14, 1948, at Denver, Colorado, and thereafter ratified by the legislatures of each of the States aforesaid, which said compact reads as follows:

"ARKANSAS RIVER COMPACT

"The State of Colorado and the State of Kansas, parties signatory to this Compact (hereinafter referred to as 'Colorado' and 'Kansas', respectively, or individually as a 'State', or collectively as the 'States') having resolved to conclude a compact with respect to the waters of the Arkansas River, and being moved by considerations of interstate comity, having appointed commissioners as follows: 'Henry C. Vidal, Gail L. Ireland, and Harry B. Mendenhall, for Colorado; and

George S. Knapp, Edward F. Arn, William E. Leavitt, and Roland H. Tate, for Kansas'; and the consent of the Congress of the United States to negotiate and enter into an interstate compact not later than January 1, 1950, having been granted by Public Law 34, 79th Congress, 1st Session, and pursuant thereto the President having designated Hans Kramer as the representative of the United States, the said commissioners for Colorado and Kansas, after negotiations participated in by the representative of the United States, have agreed as follows:

"ARTICLE I

"The major purposes of this Compact are to:

"A. Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

"B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

"ARTICLE II

"The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of Colorado v. Kansas (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers.

"ARTICLE III

"As used in this Compact:

"A. The word 'Stateline' means the geographical boundary line between Colorado and Kansas.

"B. The term 'waters of the Arkansas River' means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from the Stateline, and excluding waters brought into the Arkansas River Basin from other river basins.

"C. The term 'Stateline flow' means the flow of waters of the Arkansas River as determined by gaging stations located at or near the Stateline. The flow

as determined by such stations, whether located in Colorado or Kansas, shall be deemed to be the actual Stateline flow.

"D. 'John Martin Reservoir Project' is the official name of the facility formerly known as Caddoa Reservoir Project, authorized by the Flood Control Act of 1936, as amended, for construction, operation and maintenance by the War Department, Corps of Engineers, later designated as the Corps of Engineers, Department of the Army, and herein referred to as the 'Corps of Engineers'. 'John Martin Reservoir' is the water storage space created by 'John Martin Dam'.

"E. The 'flood control storage' is that portion of the total storage space in John Martin Reservoir allocated to flood control purposes.

"F. The 'conservation pool' is that portion of the total storage space in John Martin Reservoir lying below the flood control storage.

"G. The 'ditches of Colorado Water District 67' are those ditches and canals which divert water from the Arkansas River or its tributaries downstream from John Martin Dam for irrigation use in Colorado.

"H. The term 'river flow' means the sum of the flows of the Arkansas and the Purgatoire Rivers into John Martin Reservoir as determined by gaging stations appropriately located above said Reservoir.

"I. The term 'the Administration' means the Arkansas River Compact Administration established under Article VIII.

"ARTICLE IV

"Both States recognize that:

"A. This Compact deals only with the waters of the Arkansas River as defined in Article III.

"B. This Compact is not concerned with the rights, if any, of the State of New Mexico or its citizens in and to the use in New Mexico of waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River.

"C. (1) John Martin Dam will be operated by the Corps of Engineers to store and release the waters of the Arkansas River in and from John Martin Reservoir for its authorized purposes.

"(2) The bottom of the flood control storage is presently fixed by the Chief of Engineers, U.S. Army, at elevation 3,851 feet above mean sea level. The flood control storage will be operated for flood control purposes and to those ends will impound or regulate the stream-flow volumes that are in excess of the then available storage capacity of the conservation pool. Releases from the flood control storage may be made at times and rates determined by the Corps of Engineers to be necessary or advisable without regard to ditch diversion capacities or requirements in either or both States.

"(3) The conservation pool will be operated for the benefit of water users in Colorado and Kansas, both upstream and downstream from John Martin Dam, as provided in this Compact. The maintenance of John Martin Dam and appurtenant works may at times require the Corps of Engineers to release water then impounded in the conservation pool or to prohibit the storage of water therein until such maintenance work is completed. Flood control operation may also involve temporary utilization of conservation storage.

"D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purpose of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

"ARTICLE V

"Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River:

"A. Winter storage in John Martin Reservoir shall commence on November 1st of each year and continue to and include the next succeeding March 31st. During said period all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow, but such releases shall not exceed 100 c. f. s. (cubic feet per second) and water so released shall be used without avoidable waste.

"B. Summer storage in John Martin Reservoir shall commence on April 1st of each year and continue to and include the next succeeding October 31st. During said period, except when Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow up to 500 c. f. s., and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c. f. s, and 750 c. f. s., irrespective of releases demanded by Colorado.

"C. Releases of water stored pursuant to the provisions of paragraphs A and B of this Article shall be made upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Administration, separate releases of stored water to

Colorado shall not exceed 750 c. f. s., separate releases of stored water to Kansas shall not exceed 500 c. f. s., and concurrent releases of stored water shall not exceed a total of 1,250 c. f. s.: Provided, that when water stored in the conservation pool is reduced to a quantity less than 20,000 acre-feet, separate releases of stored water to Colorado shall not exceed 600 c. f. s., separate releases of stored water to Kansas shall not exceed 400 c. f. s., and concurrent releases of stored water shall not exceed 1,000 c. f. s.

"D. Releases authorized by paragraphs A, B and C of this Article, except when all Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, shall not impose any call on Colorado water users that divert waters of the Arkansas River upstream from John Martin Dam.

"E. (1) Releases of stored water and releases of river flow may be made simultaneously upon the demands of either or both States.

"(2) Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the Administration.

"(3) Releases of river flow and of stored water to Colorado shall be measured by gaging stations located at or near John Martin Dam and the releases to which Kansas is entitled shall be satisfied by an equivalent in Stateline flow.

"(4) When water is released from John Martin Reservoir appropriate allowances as determined by the Administration shall be made for the intervals of time required for such water to arrive at the points of diversion in Colorado and at the Stateline.

"(5) There shall be no allowance or accumulation of credits or debits for or against either State.

"(6) Storage, releases from storage and releases of river flow authorized in this Article shall be accomplished pursuant to procedures prescribed by the Administration under the provisions of Article VIII.

"F. In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed.

Such priority administration by Colorado shall be continued until the Administration finds that water is again available in the conservation pool for release as provided in this Compact, and timely notice of such finding shall be given by the Administration to the State Engineer of Colorado or his duly authorized representative: Provided, that except as controlled by the operation of the preceding provisions of this paragraph and other applicable provisions of this Compact, when there is water in the conservation pool the water users upstream from John Martin Reservoir shall not be affected by the decrees to the ditches in Colorado Water District 67. Except when administration in Colorado is on a priority basis the water diversions in Colorado Water District 67 shall be administered by Colorado in accordance with distribution agreements made from time to time between the water users in such District and filed with the Administration and with the State Engineer of Colorado or, in the absence of such agreement, upon the basis of the respective priority decrees, as against each other, in said District.

"G. During periods when Colorado reverts to administration of decreed priorities, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir. Waters of the Arkansas River originating in Colorado which may flow across the Stateline during such periods are hereby apportioned to Kansas.

"H. If the usable quantity and available for use of the waters of the Arkansas River to water users in

Colorado Water District 67 and Kansas will be thereby materially depleted or adversely affected, (1) priority rights now decreed to the ditches of Colorado Water District 67 shall not hereafter be transferred to other water districts in Colorado or to points of diversion or places of use upstream from John Martin Dam; and (2) the ditch diversion rights from the Arkansas River in Colorado Water District 67, and of Kansas ditches between the Stateline and Garden City shall not hereafter be increased beyond the total present rights of said ditches, without the Administration, in either case (1) or (2), making findings of fact that no such depletion or adverse effect will result from such proposed transfer or increase. Notice of legal proceedings for any such proposed transfer or increase shall be given to the Administration in the manner and within the time provided by the laws of Colorado or Kansas in such cases.

"ARTICLE VI

"A. (1) Nothing in this Compact shall be construed as impairing the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas and over the waters that flow from Colorado across the Stateline into Kansas.

"(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of

Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

"B. Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the Stateline for irrigation uses in Kansas only, Colorado concedes to Kansas and Kansas hereby assumes exclusive administrative control over the operation of the Frontier Canal and its headworks for such purposes, to the same extent as though said works were located entirely within the State of Kansas. Water carried across the Stateline in the Frontier Canal or another similarly situated canal shall be considered to be part of the Stateline flow.

"ARTICLE VII

"A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term 'State' is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

"B. This Compact establishes no general principle or precedent with respect to any other interstate stream.

"C. Wherever any State or Federal official or agency is referred to in this Compact such reference shall apply to the comparable official or agency succeeding to their duties and functions.

"ARTICLE VIII

"A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as 'the Administration.'

"B. The Administration shall have power to:

"(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

"(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operation of John Martin Reservoir Project they shall be subject to the approval of the District Engineer in charge of said Project;

"(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties.

"C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in

Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the administration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

"D. The State representatives shall be appointed by the respective Governors within thirty days after the effective date of this Compact. The Administration shall meet and organize within sixty days after such effective date. A quorum for any meeting shall consist of four members of the Administration: Provided, that at least two members are present from each State. Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote. In case of a divided vote on any matter within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

"E. (1) The salaries, if any, and the personal expenses of each member shall be paid by the government which he represents. All other expenses incident to the administration of this Compact which are not paid by the United States shall be borne by the States on the basis of 60 per cent by Colorado and 40 per cent by Kansas.

"(2) In each even numbered year the Administration shall adopt and transmit to the Governor of each State its budget covering anticipated expenses for the forthcoming biennium and the amount thereof payable by each State. Each State shall appropriate and pay the amount due by it to the Administration.

"(3) The Administration shall keep accurate accounts of all receipts and disbursements and shall include a statement thereof, together with a certificate of audit by a certified public accountant, in its annual report. Each State shall have the right to make an examination and audit of the accounts of the Administration at any time.

"F. Each State shall provide such available facilities, equipment and other assistance as the Administration may need to carry out its duties. To supplement such available assistance the Administration may employ engineering, legal, clerical, and other aid as in its judgment may be necessary for the performance of its functions. Such employees shall be paid by and be responsible to the Administration, and

shall not be considered to be employees of either State.

"G. (1) The Administration shall cooperate with the chief official of each State charged with the administration of water rights and with Federal agencies in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River and as to the operation and siltation of John Martin Reservoir and other related structures. The Administration shall cooperate in the procurement, interchange, compilation and publication of all factual data bearing upon the administration of this Compact without, in general, duplicating measurements, observations or publications made by State or Federal agencies. State officials shall furnish pertinent factual data to the Administration upon its request. The Administration shall, with the collaboration of the appropriate Federal and State agencies, determine as may be necessary from time to time, the location of gaging stations required for the proper administration of this Compact and shall designate the official records of such stations for its official use.

"(2) The Director, U. S. Geological Survey, the Commissioner of Reclamation and the Chief of Engineers, U. S. Army, are hereby requested to collaborate with the Administration and with appropriate State officials in the systematic determination and correlation of data referred to in paragraph G (1) of this Article and in the execution of other duties of

such officials which may be necessary for the proper administration of this Compact.

"(3) If deemed necessary for the administration of this Compact, the Administration may require the installation and maintenance, at the expense of water users, of measuring devices of approved type in any ditch or group of ditches diverting water from the Arkansas River in Colorado or Kansas. The chief official of each State charged with the administration of water rights shall supervise the execution of the Administration's requirements for such installations.

"H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights.

"I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found.

"J. The Administration shall report annually to the Governors of the States and to the President of the United States as to matters within its purview.

"ARTICLE IX

"A. This Compact shall become effective when ratified by the Legislature of each State and when consented to by the Congress of the United States by legislation providing substantially, among other things, as follows:

" 'Nothing contained in this Act or in the Compact herein consented to shall be construed as impairing or affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such Compact: Provided, that the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve.'

"B. This Compact shall remain in effect until modified or terminated by unanimous action of the States and in the event of modification or termination all rights then established or recognized by this Compact shall continue unimpaired.

"In Witness whereof, The commissioners have signed this Compact in triplicate original, one of which shall be forwarded to the Secretary of State of the United States of America and one of which shall be forwarded to the Governor of each signatory State.

"Done in the City and County of Denver, in the state of Colorado, on the fourteenth day of December, in the Year of our Lord One Thousand Nine Hundred and Forty-eight.

Henry C. Vidal
Gail L. Ireland
Harry B. Mendenhall
Commissioners for Colorado
George S. Knapp
Edward F. Arn
William E. Leavitt
Roland H. Tate
Commissioners for Kansas

"Attest:

"Warden L. Noe, Secretary

"Approved:

"Hans Kramer
Representative of the United States"

SEC. 2. Nothing contained in this Act or in the compact herein consented to shall be construed as impairing or affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such compact: *Provided,* That the Chief of Engineers is

hereby authorized to operate the conservation features of the John Martin Reservoir project in a manner conforming to such compact with such exceptions as he and the Administration created pursuant to the compact may jointly approve.

Approved May 31, 1949.

APPENDIX L

RESOLUTION CONCERNING AN
OFFSET ACCOUNT IN JOHN MARTIN
RESERVOIR FOR COLORADO PUMPING,
AS AMENDED MARCH 30, 1998

APPENDIX L

Resolution Concerning An Offset Account In John Martin Reservoir For Colorado Pumping As Amended March 30, 1998

WHEREAS, ARTICLE IV-D of the Arkansas River Compact provides as follows:

> This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combination thereof, which may involve construction of dams, reservoirs and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction;

and

WHEREAS, the United States Supreme Court has determined that post-Compact well pumping in the State of Colorado has caused material depletions of usable Stateline flows of the Arkansas River in violation of the Arkansas River Compact [hereinafter the "Compact"], *Kansas v. Colorado*, 115 S.Ct 1733 (1995); and

WHEREAS, the State of Colorado [hereinafter "Colorado"] desires to continue to allow ground water pumping by its water users in excess of the pre-Compact pumping entitlement of 15,000 acre-feet per year determined by the United States Supreme Court as long as any depletions to usable Stateline flows caused by such pumping are replaced; and

WHEREAS, Section 2 of the Act of Congress approving the Compact provides in relevant part as follows:

> [T]he Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve[;]

and

WHEREAS, the issue of Compact compliance by Colorado is presently pending before the Special Master appointed by the United States Supreme Court; and

WHEREAS, an account in John Martin Reservoir [hereinafter the "Reservoir"] is not necessary for Colorado's compliance with the Compact, but an account would be of benefit to Colorado by facilitating compliance with the Compact by Colorado and its water users to the extent that Colorado allows post-Compact well pumping by its water users in excess of the pre-Compact entitlement of 15,000 acre-feet per

year, and Colorado has requested such an account; and

WHEREAS, the Offset Account [as hereinafter defined] would create benefits for water users in Kansas but also monitoring and accounting burdens for the State of Kansas [hereinafter "Kansas"]; and

WHEREAS, the existence of an account in the Reservoir does not, in and of itself, assure compliance with the Compact by Colorado and its water users; and

WHEREAS, the Arkansas River Compact Administration [hereinafter the "Administration"] recognizes that it has the authority to create the Offset Account as provided for herein, but that neither the Administration nor either of its member states has any obligation to create the account provided for in this Resolution; and

WHEREAS, concurrently with the adoption of the original form of this Resolution, Colorado and Kansas entered into a Stipulation Re Offset Account in John Martin Reservoir [hereinafter the "Stipulation"]; and

WHEREAS, this Resolution is being readopted as amended;

NOW THEREFORE, BE IT RESOLVED that, pursuant to Section 2 of the Act of Congress approving the Compact, the Administration and the Chief of Engineers of the Corps of Engineers or his duly authorized representative, jointly approve a storage

account in the Reservoir to be established and operated as follows:

1. There is hereby established a new storage account in the Reservoir to be known as the "Offset Account in John Martin Reservoir for Colorado Pumping" [hereinafter the "Offset Account"]. The size of the Offset Account shall be 20,000 acre-feet. Deliveries of water to the Offset Account shall be stored in the conservation pool but shall not be inflows into the Reservoir which accrue to conservation storage, and water in the Offset Account shall reside below elevation 3,851 feet above mean sea level (bottom of flood control storage). The establishment of the Offset Account is for the primary purpose of facilitating Compact compliance by Colorado and its water users after the effective date of this Resolution and is not for the purpose of repayment for violations of the Compact by Colorado prior to the effective date of this Resolution or replacement to Colorado ditches except as authorized herein. The intent of this Resolution is that, to the extent that Colorado allows post-Compact well pumping in Colorado in excess of the pre-Compact entitlement of 15,000 acre-feet per year, any depletions to usable Stateline flows caused by such pumping be contemporaneously offset by delivering replacement water to the Stateline or by making replacement water available in the Offset Account where it can be called for by Kansas in accordance with this Resolution.

2. The Offset Account shall be separate from and in addition to the accounts established by the Administration's Resolution Concerning an

Operating Plan for John Martin Reservoir as revised through December 11, 1984 [hereinafter the "1980 Operating Plan"] and the John Martin Reservoir Permanent Pool authorized by the Administration Resolution of August 14, 1976 [hereinafter the "Permanent Pool"].

3. The Colorado State Engineer or his delegate [hereinafter the "Colorado State Engineer"] may deliver or permit the delivery by Colorado water users of water to the Offset Account upon timely notice to the Kansas Chief Engineer or his delegate [hereinafter the "Kansas Chief Engineer"]. Such notice shall specify and document the following: the source of the water delivered, the amount of water, the purpose for which the water is delivered, the time of delivery, the rate of delivery, the extent to which the water is fully consumable, and the quantity, timing, and location of any associated return flows.

4. Only water approved for storage in the Offset Account by the Colorado State Engineer may be delivered to the Offset Account, provided that adequate transit losses shall be charged during delivery of water to the Offset Account, which losses shall be determined by the Colorado State Engineer using the method set out in U.S. Geological Survey Water Resources Investigations 78-75 (Sept. 1978) [hereinafter the "Livingston Formula"]. At the time of delivery of water to the Offset Account, the Colorado State Engineer shall determine the extent to which water delivered to the Offset Account is fully consumable and shall thereafter demand the release of any water necessary to maintain historical return flows to

Colorado ditches and the Stateline from deliveries of water historically used for agricultural irrigation; provided however, that the Kansas Chief Engineer may, at his option, direct that water necessary to maintain historical return flows to the Stateline [hereinafter "Stateline Return Flow"] remain in the Offset Account or be transferred to the Kansas account provided for in Section II of the 1980 Operating Plan [hereinafter "Kansas Section II Account"] for later release, and provided further, that the Colorado State Engineer's determination of the extent to which water delivered to the Offset Account is fully consumable shall not be binding on the Administration or Kansas. Once the Colorado State Engineer has determined the extent to which the water delivered to the Offset Account is fully consumable or is Stateline Return Flow, and has notified the Kansas Chief Engineer in accordance with paragraph 3 above, the Kansas Chief Engineer may demand the release of the water in the Offset Account which is fully consumable at any time and at any rate and may demand the release or direct the transfer of water in the Offset Account which is Stateline Return Flow at any time and at any rate.

5. Evaporation charges shall be made against water stored in the Offset Account in the manner set forth in Subsection II F of the 1980 Operating Plan. The evaporation charges shall be prorated amongst conservation storage and the accounts, including the Offset Account, according to the amounts in them. Evaporation from water in the Offset Account shall be charged against Colorado until:

A. The water is released or transferred in accordance with this Resolution, or

B. Thirty days after the Colorado State Engineer has determined and notified the Kansas Chief Engineer of the estimated monthly net depletion to usable Stateline flows caused by post-Compact diversions of tributary ground water from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo Dam and Stateline ("the estimated monthly net depletion of usable Stateline flows"), to the extent the Kansas Chief Engineer has not previously demanded the release of water available for replacement in the Offset Account in an amount equal to or greater than the estimated monthly net depletion to usable Stateline flows, the evaporation loss on that amount of water or portion thereof shall thereafter be charged to Kansas. In order to determine the estimated monthly net depletion to usable Stateline flows for purposes of this paragraph only, the Colorado State Engineer shall use the following procedure unless he and the Kansas Chief Engineer agree otherwise: the Colorado State Engineer shall use the presumptive stream depletions established in Rule 4.2 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado, effective June 1, 1996 [hereinafter "Amended Rules"] and unit response functions presently utilized in accordance with the Amended Rules to determine stream depletions at the Stateline

caused by post-Compact diversions of tributary ground water from the Valley Fill Aquifer and surficial aquifers along the Arkansas River Between Pueblo Dam and the Stateline. Further, the Colorado State Engineer shall use the same procedures currently used under the Amended Rules to determine the timing and location of return flows from diversions of imported waters and other augmentation water in determining net stream depletions at the Stateline. For the summer storage season in the Reservoir (April 1 – October 31), the Colorado State Engineer shall assume that net depletions to usable Stateline flows are 81.9 percent of the net stream depletions at the Stateline, and for the winter storage season (November 1 – March 31), the Colorado State Engineer shall assume that net depletions to usable Stateline flows are 34.9 percent of the net stream depletions at the Stateline; provided that during the summer storage season, if 72 percent of the measured monthly Stateline flow exceeds 30,000 acre-feet, or during the winter storage season, 25 percent of the measured monthly Stateline flows exceeds 7,500 acre-feet, the Colorado State Engineer shall assume that net depletions to usable Stateline flows are 9.9% of the net stream depletions at the Stateline for such months. In addition, if, during the summer storage season, 72% of the measured Stateline flow, limited to 30,000 acre-feet per month, exceeds 140,000 acre-feet, then the Colorado State Engineer shall assume that net depletions to

usable Stateline flows thereafter within that summer storage season shall be 9.9% of the net stream depletions at the Stateline. The computation of depletions to usable Stateline flows described in this paragraph shall only be for the purpose of assigning the evaporation charge for water stored in the Offset Account.

Notwithstanding paragraph B above, until thirty days after the Colorado State Engineer has determined and notified the Kansas Chief Engineer of the quantity and timing of any estimated Stateline Return Flow in the Offset Account, and the time for release of such water to the Stateline has passed, the evaporation loss on that amount of Stateline Return Flow shall be charged to Colorado, but shall thereafter be charged to Kansas.

6. In accordance with the provisions of paragraphs 3 and 4 above, the Colorado State Engineer may deliver or permit the delivery of water by Colorado water users to the Offset Account, in an amount not to exceed 1,500 acre-feet per Compact year, for the purpose of replacing depletions to the inflows to conservation storage caused by post-Compact well pumping in Colorado and may (1) direct the transfer of such water from the Offset Account to conservation storage to replace depletions to the inflows to conservation storage, or (2) to the extent such that water is not needed to replace depletions to the inflows to conservation storage, may change the prior designation of water previously designated for the purpose of transfer to conservation storage. Once the

Colorado State Engineer has notified the Kansas Chief Engineer of the change of designation, such water be released or transferred in accordance with this Resolution.

7. Releases from the Offset Account may be made simultaneously with deliveries into the Offset Account. However, such simultaneous releases and deliveries cannot create a deficit in the Offset Account.

8. Transit losses for releases from the Offset Account shall not be replenished from the Kansas transit loss account. Transit losses associated with the release of Stateline Return Flow from the Offset Account shall be replaced by the entity which delivered such Stateline Return Flow to the Offset Account, provided that any increase in transit losses which results if the Kansas State Engineer directs that Stateline Return Flow remain in the Offset Account and calls for the release of such Stateline Return Flow at a later time shall be borne by Kansas. Such transit losses on releases of Stateline Return Flow shall be determined using the Livingston Formula for Subreach 6, removing bank and channel storage from the calculation, unless the Colorado State Engineer and the Kansas Chief Engineer agree otherwise. In order to ensure the arrival of releases of Stateline Return Flow at the Stateline if the Kansas Chief Engineer calls for the release of such Stateline Return Flow during the summer storage season in the Reservoir (April 1-October 31), an amount of water equal to the transit losses determined using the Livingston Formula for Subreach 6, including bank and channel storage,

shall be released with the Stateline Return Flow and shall be charged to the entity which delivered the Stateline Return Flow, except that Kansas shall bear any increase in evaporation resulting from the summer storage release.

9. Notwithstanding other provisions of this Resolution, 500 acre-feet of fully consumable water shall be delivered by Colorado or Colorado water users to the Offset Account by April 1 of each year, or at a later time in any one year if agreed to by the Colorado State Engineer and the Kansas Chief Engineer, which delivery shall be a prerequisite for Colorado's right to deliver or permit the delivery by Colorado water users of up to 10,000 acre-feet of water (including the said 500 acre-feet) to the Offset Account pursuant to this Resolution during the period until the next succeeding April 1. For delivery of water to the Offset Account in excess of 10,000 acre-feet during each period, five percent of the amount delivered shall be allocated to Kansas. The said 500 acre-feet and five percent of any water delivered in excess of 10,000 acre-feet during each period [hereinafter "Storage Charge Water"] shall be allocated to Kansas, not for offset of depletions of usable flow at the Stateline but as part of Kansas' equitable share of the benefits arising from the creation of the Offset Account in the Reservoir. The Kansas Chief Engineer may direct the Storage Charge Water be transferred to the Kansas Section II Account or may demand the release of Storage Charge Water at any time and at any rate. If Storage Charge Water is retained in the Offset Account, Kansas shall bear the evaporation after April 1. Colorado water users shall bear

the evaporation prior to April 1. Any shortfall due to evaporation in the 500 acre-foot April 1 delivery requirement shall be made up out of the next delivery of water after April 1 by Colorado water users. Kansas shall bear the transit losses associated with the release of Storage Charge Water. Such transit losses shall be calculated using the Livingston Formula for Subreach 6, unless the Colorado State Engineer and the Kansas Chief Engineer agree otherwise.

10. No transfers, releases or exchanges shall be made of water in the Offset Account except releases and transfers authorized by this Resolution or approved by the Administration.

11. Not later than December 1 of each year, the Colorado State Engineer shall make an accounting of the operation under this Resolution for the previous Compact year available to the Operations Committee of the Administration and to interested parties.

12. In recognition of the fact that the operation of the Offset Account is for the primary purpose of facilitation Compact compliance by Colorado in connection with increased post-Compact pumping by Colorado water users, the Colorado State Engineer shall report to the Administration and the Kansas Chief Engineer on a monthly basis the timing and amount of deliveries to the Offset Account, the monthly pumping in location and amount in excess of Colorado's pre-Compact entitlement, and Colorado's monthly accounting of Compact compliance, including documentation not already provided and a report of the status of

water delivered to the Offset Account, within two months of the end of the month reported. The Administration recognizes that use of this Offset Account to facilitate Compact compliance by Colorado after the effective date of this Resolution may result in additional monitoring costs to Kansas. The Administration recognizes that Kansas is not waiving its right to claim reasonable compensation from Colorado for such additional monitoring expenses incurred by Kansas after the effective date of this Resolution. The Colorado State Engineer shall timely share relevant information with the Kansas Chief Engineer concerning use of the Offset Account in a manner that will minimize Kansas' monitoring costs. Each year the Colorado State Engineer and the Kansas Chief Engineer shall discuss further ways to minimize such costs.

13. In the event the runoff conditions occur in the Arkansas River basin upstream from the Reservoir that cause water to spill from the Reservoir, then water stored in the Permanent Pool in excess of 10,000 acre-feet shall spill before water stored in the accounts granted in Subsections III A, B, and C of the 1980 Operating Plan, which shall spill before the water stored in the Offset Account, which shall spill before the accounts granted in Section II of the Operating Plan, which shall spill before the Kansas Transit Loss Account, all of which shall spill before conservation storage.

14. Water available under priority rights decreed to the ditches of Colorado Water District 67 [hereinafter "District 67"] may be stored in the Offset

Account only when no water is accruing to conservation storage, provided that return flows shall be maintained and accounted for in accordance with paragraphs 3 and 4 above; and water may be transferred into the Offset Account from accounts of the ditches of District 67 in the Reservoir provided for in Section II of the 1980 Operating Plan in accordance with this Resolution; provided that such storage or transfers are in accordance with the Amended Rules adopted by the Colorado State Engineer and, with respect to transfers from District 67 accounts, shall include both the consumable and return flow portions of such water.

15. Neither the adoption of this Resolution nor the establishment or operation of the Offset Account shall constitute a waiver of either State's rights under the Compact (if such a waiver is possible as a matter of law) or prejudice the ability of either State to represent its interests in present or future cases or controversies before the Administration or any court of competent jurisdiction, except as provided in the Stipulation.

16. All terms employed in this Resolution which are defined in the Compact or the 1980 Operating Plan shall have the same meaning as set out in the Compact or the 1980 Operating Plan, as the case may be.

17. The effective date of this Resolution shall be the date on which the Chief of Engineers of the Corps of Engineers, or his duly authorized representative, gives his approval by signing and dating below in the space provided. This Resolution shall

not be affected by the termination of the 1980 Operating Plan, except that operations contemplated in this Resolution which rely on the existence of the 1980 Operating Plan shall no longer occur if the 1980 Operating Plan is terminated. This Resolution shall be in full force and effect until March 31, 1998, and year-to-year thereafter subject to the following provisions:

A. Either Colorado or Kansas, through its Compact delegation, may terminate this Resolution effective March 31 by giving written notice to the Administration by February 1 of the same Compact year.

B. In the event that this Resolution is terminated, water in the Offset Account at that time may remain in storage in the Offset Account and be released or transferred as provided above until no water remains in the Offset Account, at which time the Offset Account shall be terminated.

18. Colorado may, as it sees fit, fulfill or, as a condition to delivery of water to the Offset Account by Colorado water users, require its water users to fulfill the delivery requirements and be responsible for evaporation and transit loss charges imposed on Colorado by this Resolution, provided that Colorado shall require Colorado water users who wish to deliver water to the Offset Account to comply with this Resolution in all respects and shall require immediate cessation of the use of the Offset Account by any Colorado water user or users in the event of any substantial failure by

such Colorado water user or users to comply with this Resolution.

19. Any releases of water from the Offset Account shall not exceed the channel capacity as determined by the Corps of Engineers.

JOINTLY APPROVED:

/s/ Larry E. Trujillo, Sr.
Chairman
Arkansas River Compact Administration

/s/ Mary Louise Clay
Recording Secretary
Arkansas River Compact Administration

/s/ Lloyd S. Wagner
District Engineer,
Albuquerque District,
Duly Authorized Representative of the Chief of Engineers
U.S. Army Corps of Engineers

30 March 1998
Date

APPENDIX M

MAP OF ARKANSAS RIVER BASIN

M.1

292-42-2265 Revised June 1947 *Pueblo and Trinidad Reservoirs added 9/93 for No. 105, Orig. (Not to scale)

TRANSMOUNTAIN DIVERSIONS INTO ARKANSAS RIVER BASIN

1. Fremont Pass Ditch
2. Columbine Ditch
3. Ewing Ditch
4. Wurtz Ditch
5. Busk-Ivanhoe Tunnel
6. Independence Pass Tunnel
7. Larkspur Ditch

WATER DISTRICT 14 — WATER DISTRICT 17 — WATER DISTRICT 67

KANSAS DIVERSIONS

PUEBLO RESERVOIR

JOHN MARTIN RESERVOIR

TRINIDAD RESERVOIR

LAKE · CHAFFEE · PARK · FREMONT · CUSTER · PUEBLO · HUERFANO · LAS ANIMAS · TELLER · EL PASO · CROWLEY · OTERO · BENT · PROWERS · KIOWA · LINCOLN · CHEYENNE · GREELEY · WICHITA · SCOTT · HAMILTON · KEARNY · FINNEY · GRAY · FORD · STANTON · GRANT · HASKELL

LEADVILLE · Buena Vista · Salida · Canon City · Florence · Cripple Creek · Colorado Springs · Pueblo · Rocky Ford · La Junta · Las Animas · Lamar · Walsenburg · Trinidad · Aguilar · Hugo · Limon · Tribune · Leoti · Scott City · Syracuse · Garden City · Lakin · Cimarron · Dodge City · Johnson · Springfield

Caddoa Lamar · Lamar to State Line · State Line to Syracuse · Syracuse to Garden City

152 square miles in New Mexico

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED AREAS

LOCATION OF KEY GAGING STATIONS

Scale 10 0 10 20 30 40 Miles

INDEX MAP
ARKANSAS RIVER BASIN ABOVE DODGE CITY, KANSAS

COLORADO · KANSAS · OKLAHOMA · NEW MEXICO · TEXAS

Base compiled from U.S. Geological Survey state base maps – 1:500,000

COLORADO - KANSAS
ARKANSAS RIVER COMPACT COMMISSION

GENERAL MAP OF THE
ARKANSAS RIVER BASIN
IN
COLORADO & WESTERN KANSAS
1947 *

COMPILED BY COLORADO WATER CONSERVATION BOARD

267-2301